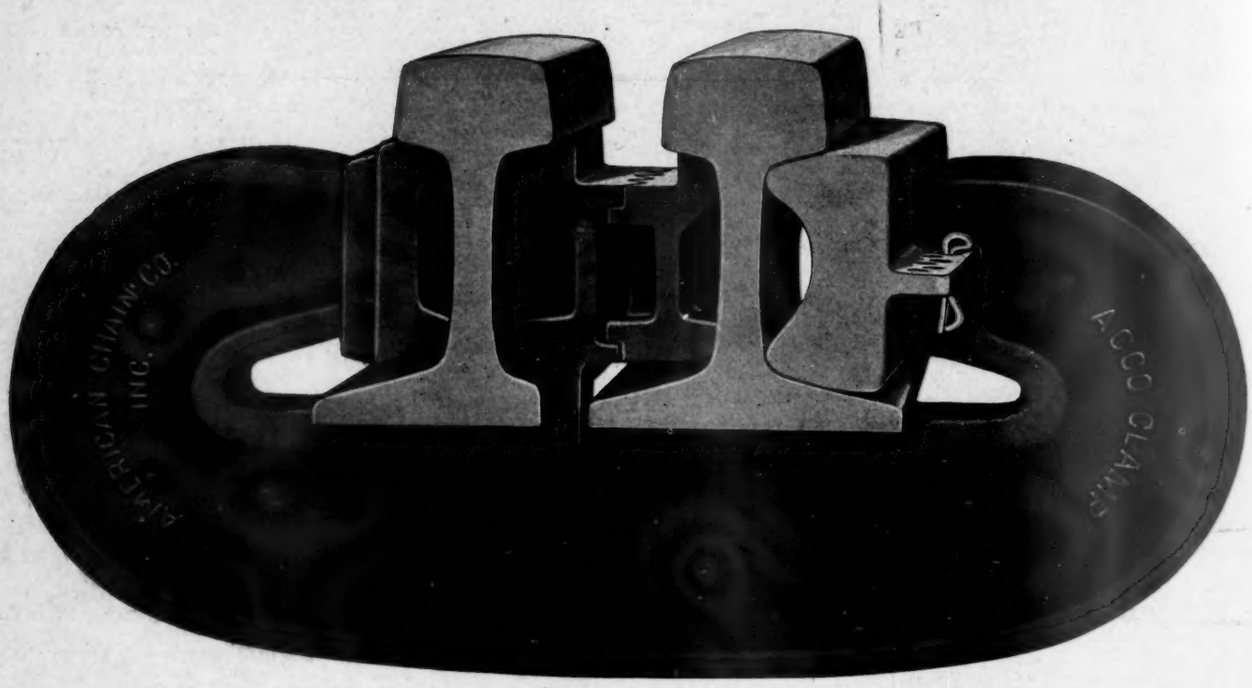
Railway Age

DAILY EDITION

FIRST HALF OF 1922, No. 24e NEW YORK—THURSDAY, JUNE 22, 1922—ATLANTIC CITY SIXTY-SEVENTH YEAR

Published weekly by Simmons-Boardman Pub. Co., Woolworth Bldg., New York, N. Y. Subscription Price, U. S., Canada and Mexico, $6.00; foreign countries (excepting daily editions), $8.00; single copies, 25c. Entered as second-class matter, January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879

"Acco" Drop Forged GUARD RAIL CLAMP



ACCO GUARD RAIL CLAMPS are drop forged from open hearth steel of an analysis equal to that of your rail specifications and afterwards heat treated to the required physical properties.

The design provides for an increased metal section at points under greatest tension. Filler blocks, end blocks and wedge are made of cast steel and heat treated.

Yokes are interchangeable and can be used on various rail sections by simply using suitable blocks.

The Acco Drop Forged Guard Rail Clamp can be seen at the Convention.

American Chain Company

INCORPORATED

Reading Specialties Division

BRIDGEPORT, CONNECTICUT

In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

8

District Sales Offices: Boston Chicago New York Pittsburgh Philadelphia Portland, Ore. San Francisco

Railway Age

DAILY EDITION

VOLUME 72 JUNE 22, 1922 NUMBER 24e

PUBLISHED EVERY SATURDAY AND DAILY EIGHT TIMES IN JUNE BY THE SIMMONS-BOARDMAN PUBLISHING COMPANY, WOOLWORTH BUILDING, NEW YORK.

EDWARD A. SIMMONS, *Pres.* SAMUEL O. DUNN, *Vice-Pres.*
L. B. SHERMAN, *Vice-Pres.* C. R. MILLS, *Vice-Pres.*
HENRY LEE, *Vice-Pres. & Treas.* ROY V. WRIGHT, *Sec'y.*

CHICAGO: TRANSPORTATION BLDG. CLEVELAND: 4300 EUCLID AVE.
CINCINNATI: FIRST NATIONAL BANK BLDG. WASHINGTON: HOME LIFE BLDG.
NEW ORLEANS: MAISON BLANCHE ANNEX.
LONDON, ENGLAND: 34, VICTORIA ST., WESTMINISTER, S. W. 1.
CABLE ADDRESS: URASIGMEC, LONDON.

EDITORIAL STAFF:

SAMUEL O. DUNN, *Editor.*
ROY V. WRIGHT, *Managing Editor.*

E. T. HOWSON, B. B. ADAMS, H. F. LANE, R. E. THAYER, C. B. PECK, W. S. LACHER, A. F. STUEBING, C. W. FOSS, K. E. KELLENBERGER, ALFRED G. OEHLER, F. W. KRAEGER, HOLCOMBE PARKES, C. N. WINTER, MILBURN MOORE, E. L. WOODWARD, J. G. LYNE, J. H. DUNN, D. A. STEEL, K. H. KOACH, R. C. AUGUR

BUSINESS DEPARTMENT REPRESENTATIVES

F. H. THOMPSON, F. C. KOCH, GEORGE SLATE, R. H. SMITH, J. M. RUTHERFORD, H. L. BURRHUS, E. A. LUNDY, H. B. BOLANDER, I. E. ANDERSON, P. TRAEGER, J. E. TAYLOR, J. A. MILLER, C. H. KNOWLTON, R. F. DUYSTERS
JAMES CURRIE

Entered at the Post Office of New York, N. Y., as mail matter of the second class.

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free; United States, Mexico and Canada $6.00. Foreign Countries (excepting daily editions), $8.00. Foreign subscriptions may be paid through our London office in £ s. d. Single copies, 25 cents each.

WE GUARANTEE that of this issue, 11,000 copies were printed; that of these 11,000 copies, 10,300 were mailed to regular paid subscribers to the Railway Age and Railway Mechanical Engineer; 110 were mailed to advertisers; 490 were provided for counter and news companies sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.)

A Field for Pulverized Fuel

Only a few years ago pulverized coal was hailed as the solution of the railroad fuel problem. A number of tests were made, some of which were fairly successful, but the main fact brought out was that existing designs of locomotives are not adapted for satisfactory operation with such fuel. At present pulverized coal is practically a dead issue insofar as the railroads are concerned. It is quite possible that the initial failure of the system will retard its adoption where it might effect considerable economies. Recent investigations have developed improved methods of burning powdered coal and the highest boiler efficiency ever recorded was obtained in a plant using such fuel. Railroads should certainly consider its use in stationary plants; in one case that was investigated not long ago it was found that by using pulverized fuel in a railroad power house, the cost of operation could be reduced with a saving of about $30,000 in the initial expenditure as compared with hand or stoker firing. Pulverized coal is not a specific, but it is no doubt the cheapest fuel under certain conditions. Its use in stationary plants may develop further improvements and point the way for further applications in locomotive service.

Liaison Between A. R. A. Sections

Both F. W. Brazier and C. D. Young made some excellent suggestions in their discussions at the Purchases and Stores meeting Tuesday morning. Both referred in particular to consultations which would prove profitable between Division V and Division VI. Take for instance the recommended practices for the Reclamation of Material as developed by Division VI. Mr. Young pointed out items in the committee report which were at variance with ideas that have already been expressed by Division V. Would it not be advisable in developing any such reports to confer with either the secretaries or specially appointed representatives of the various sections of the A. R. A. on matters in which there is community of interest? By doing so far more workable practices would be evolved and the greatest good would result from the expert work performed by all divisions of the American Railway Association.

Equate Costs to Service Rendered

It is plain, everyday economics to insure that no expenditures be made unless the result obtained from that expenditure is a return in excess of the cost. Furthermore, it is false economy to do things yourself which can be done more cheaply by others. These principles hold in the reclamation of material, as in everything else. They are perhaps more difficult of application because of the innumerable phases of the work that must be considered. The reclamation department must not do work which can be done better and more cheaply by other departments, simply for the sake of making a showing. The most careful scrutiny should be given to every article reclaimed. This not only applies to the cost of doing the work, but also to the service that is to be rendered after the work is done. We have heard stories told by railway men of how they "put it over" another department. Anything of this sort shows that a man has not a broad vision, or real appreciation of the responsibility to the railway by which he is employed.

One-Year Term for Officers

There are 16 officers and executive committee members of the Mechanical Division. The terms of the officers run for two years. In the normal course of events, after a motive power department officer has reached a position of sufficient influence in the field to be a suitable candidate for membership on the General Committee, he must pass through 32 years of service before he is advanced to the position of chairman, except as breaks in the ranks of the committee through death or retirement from the service operate in his favor. Thus, the younger and more active members of the Division have very restricted opportunity to exert a real influence in its affairs. The action of the Resolutions Committee in presenting, and the members in adopting, a resolution at the closing session of the convention on Wednesday, recommending a change

in the tenure of office of the chairman and vice-chairman from two years to one year, is likely to have an important bearing on the future welfare of the Division. The proposed change will have no detrimental effect on the continuity of policy of the Division, while the enlarged opportunity for active influence in the affairs of the organizaton by the younger men will tend to keep it in step with progress in the motive power and equipment field.

Should Reclamation Be Centralized?

In the discussion of reclamation at the convention of the Purchases and Stores Division the recommendation was repeated several times that all the work of reclaiming material be under the jurisdiction of the stores department. The principal arguments in favor of this arrangement are that the stores department knows what material is required and that reclamation work is given special attention if it is concentrated in that department. In general, the conclusion reached by the purchasing and stores officers is sound. The advantages of a general reclamation plant for all classes of material is evident, but under certain conditions there may be considerable saving by doing the work in the mechanical or maintenance departments. Oftentimes facilities are available in the shops to handle the same work that would be done in a special reclamation plant. In such a case centralizing the reclamation work would involve a duplication that would not be economical. Spring reclamation is a typical example. The remaking of springs is an important part of the blacksmith work in locomotive shops and there seems no valid reason why the shop equipment and the experienced shop forces should not be utilized for spring reclamation, which requires considerable skill and technical knowledge if it is to be handled properly.

Enginehouse Drop Pits

While overhead traveling cranes have been installed in a few enginehouses and while the Whiting hoist has achieved a well deserved popularity handling heavy repairs, in others it is essential that all enginehouses be provided with an adequate number of drop pits, especially engine truck and tender wheel drop pits. These are relatively inexpensive and save a large amount of time. As a rule, engine truck drop pits are placed near the end of the pit furthest from the turntable. This means that if a pair of tender wheels must be changed it is necessary to turn the locomotive. Even then only the No. 3 and 4 wheels can be changed since the engine will not back in far enough to get No.1 and 2 wheels over the drop pit. The result is that the tender must be entirely disconnected from the locomotive when a defect develops involving a change of tender wheels No. 1 or 2. The same argument also applies to trailer wheels; the relatively small investment required for tender drop pits properly located is justified by the reduced locomotive delays. In passing, a word may also be said in favor of depressed rails with inserted rail sections. A depression of 4 or 5 in. in a length of 5 ft. is usually sufficient and is a great time-saver for changing springs and spring rigging on any part of a locomotive without using jacks. In changing tires also, blocks can be put between the binders and driving boxes holding the wheels clear of the rail when over the depression. It then easy to heat the tires and shim them. It is said that with a proper understanding of how to do the job an engine truck spring can be changed, using the depressed tracks without jacks, in about 15 min.

Locomotive Inspection at Terminals

It is obvious that one of the most important functions of the engine terminal is to provide adequate inspection of locomotives. Wherever space is available and other conditions do not interfere inspection pits should be provided ahead of the ash pits, water standpipes and coaling station. These pits should be covered so that the inspectors will be protected from the weather in localities subject to severe weather conditions. The difficulty of making a careful inspection of any piece of machinery in a snow, rain, or sleet storm is self-evident. It has been found expedient to provide one or more helpers to accompany the inspector and perform certain minor repair jobs, such as tightening nuts, applying cotters, etc., as this work is discovered. This method assures that the work is done promptly and in addition the paper work of reporting the defect is eliminated and the time of some roundhouse man, who would ordinarily take the report and look up the job, is saved. The inspector reports what he finds and this work is in addition to that reported by the engineman. It is essential that the inspector make a note of any defective or broken parts which will need removal and renewal so that the storekeeper can be notified at once and have this material on hand promptly, thus reducing locomotive delays. The condition of a boiler front end is of vital importance and at the time of the monthly washout it has been found good practice to have an inspector examine carefully the spark arrester, steam pipes, exhaust base, nozzle tip, blower connection, etc. The roundhouse foreman is therefore safe in assuming that the front end of that particular locomotive, if reported in good condition, will be good for at least 30 days Violation of I. C. C. safety regulations should also be watched for by an inspector responsible for this part of the work.

Stop "Bawling Them Out"

A foreman who had been a railroader all his life recently went into an entirely different business. Incidentally, his progress in this new line of work indicates that he has ability as an executive, as well as a thorough understanding of up-to-date shop practices and methods. Asked why he had left railroad service, he said that he was tired of being "bawled out;" indeed he felt that he could not continue to maintain his self-respect and remain as a foreman in a large shop on an important railroad. When our country was forced to speed up production under war conditions it was necessary to recruit many foremen in the industries. It was quickly found that not only these new men, but the older foreman in the service, could not meet the new conditions without additional instruction and training. Foremanship courses were developed and put into operation in a considerable number of industrial plants. In a report made by the Committee on Foremen at the 1921 meeting of the National Association of Corporation Training, the statement was made that certain definite results were obtained from these foremanship courses in some of the plants; these were enumerated as follows: Improvement in the morale of the foremen and workmen; more efficient handling of standard practice and the development of better production methods; increased quantity and improved quality of production; latent capabilities of men were discovered that aided in solving more intelligently the plant personnel problems; increased intelligence in the supervisory force by personal development. The report specifically states that these are not estimated results, but ones which were actually secured. Railroad organizations generally have not promoted courses of this type. Here is one place where

distinct economies are possible without an unreasonable expenditure—and moreover an appreciation of these things will stop the "bawling out" process and hold the better class of men in railroad service.

A Co-operative Laboratory

When a new device for use on railroads is conceived there is often great difficulty in finding opportunities for testing it out and developing it. Inventors, railway supply concerns and the railroads themselves have expended millions upon millions of dollars in developing and improving such devices and appliances. In some cases devices have been tried out which were essentially wrong in principle and could never be made commercially practicable; often, if there had been a central clearing house or laboratory, the inventors or developers of these devices could have been saved from the useless expenditure of much energy and money. Then, again, a meritorious device is sometimes conceived but is finally discarded because it is not put into the right hands and has not had any real opportunity for development or demonstration. These "lost" devices form a monument to the lack of a clearing house or laboratory which should have been established long ago by the railways, strictly in their own selfish interests. It has been suggested that if such a laboratory were established under the direction of the American Railway Association, or failing that, under a group of strong roads, meritorious devices could be developed and approved and inferior ones could be discarded and the railroads would pay out only a small percentage of the amount of money that they are paying today in testing out and improving these appliances in a haphazard fashion. Unfortunately, the larger number of roads, including practically all of the small ones, today have no facilities for investigating these matters thoroughly and many of them in their efforts to improve themselves are trying out devices that will never make good. This comment is presented to strengthen, not to detract from, the editorial comment in Friday's *Daily*, entitled "How to Successfully Avoid Progress." It is not the intention to discourage the developing and testing out of new appliances, but rather to put the whole thing on a reasonable and scientific basis so that devices of merit can be developed quickly and thoroughly with the least expenditure to the railroads at large.

Special Apprentices

During the period of federal control and that immediately following the railroads had no opportunity of employing or training special apprentices. The doors of the railroads, so far as the locomotive or car departments were concerned, were practically closed against the college man. The absence of any provision for the employment or training of these men acted as effectively as a bar against them as though a definite ban had been placed against them. This ban has now been lifted. While it is not clear why the age limits of 18 to 26 were set, or why the course was made of four instead of three years' duration, still the rule of the Railroad Labor Board is on the whole a good one and permits those railroads who so desire to give these men a thorough practical training. For three years they may be assigned to any work the management desires, may be moved from one class of work to another, from the work of one trade to that of another at the discretion of the management without any of the restrictions of the classification of work of the different shop crafts. This permits of a wide and varied training for these men sufficient to broaden them out and give them a general knowledge of the various classes of work with which a foreman or other executive should be familiar. At the close of the three-year course he must work another year at some one trade of his choosing, after which he is eligible for employment as a craftsman in that trade and may work as a mechanic in that craft until such time as he proves his fitness for promotion and the management feels justified in placing him in a position of minor foremanship. Meanwhile he will be found to be a very valuable man for staff duties or other special work. No special favors are asked for him over the regular apprentice or other shop employe. He is not to take any man's place or deprive any one else of the right to promotion. All that is asked is that he be given suitable training and the right of fair and just competition wherein he may prove his worth. It would seem an opportune time for the railroads to try out a number of these technical graduates, but it will be useless to go into the matter unless arrangements are made to give them proper training.

Avoidable Air Brake Wastes

The paper entitled "Wastes in Air Brake Service" presented by Prof. S. W. Dudley before the Air Brake Association and printed in the *Daily Railway Age*, June 20, 1922, contained much that might be read with interest and profit by railroad men who are not directly connected with air brake work. One of the most easily detected wastes in air brake service is that due to unnecessary leakage of compressed air from pipe joints, hose and couplings, unions, valve sets, brake cylinder packing, etc. This can be avoided, or at least greatly reduced, provided those responsible are willing to pay the price—and the returns will be large. As an example of what may be done if there is a sufficient and well recognized incentive, examples were cited of conditions found in Europe, where practically no leakage was tolerated. This was brought about largely by the high cost of locomotive coal and a recognition of the fact that it takes considerable coal to generate the steam used by an air compressor. It is doubtful if a single instance of such a high degree of tightness could be found on any American railroad. Possibly the balance between costs for labor and coal would not warrant the general adoption of quite so high a standard. The tendency of Americans, whether railway mechanical men or not, is to maintain an attitude of blindness in regard to things that do not personally annoy them. We therefore overlook and fail to take any steps to overcome wastes which could be easily recognized and corrected if we were so disposed. As an illustration, we notice the hiss caused by an air leak and although it may be our business to attend to maintenance matters, it does not annoy us sufficiently to cause us to have it stopped, despite the fact that we well know—if we but stop to think—that air in the compressed state is far from being inexpensive. Another source of waste, by no means confined to air brake work, is caused by the lack of proper facilities for doing work economically. A good man equipped with a hammer, cold chisel, file, and a monkey wrench or pipe tongs, can do considerable work in a day, but in far too many cases no other facilities are provided, although labor costs could be reduced greatly by a small investment in equipment. Other wastes are the careless use of material, drawing out more material than necessary, or drawing new spare parts when the old ones could be repaired at small expense and be used again. A spirit of indifference to the wastes which are going on all around us results in an extravagance that is typical of the spirit of the past and not of the future.

The ability to use the large locomotives now commonly employed for handling high tonnage freight trains was made possible largely by the development of the mechanical stoker, for until stokers were applied it was not possible to realize the full capacity of such power. In the development of the stoker, attention was at first directed toward the increase in capacity that might be obtained for stoker fired locomotives, irrespective of the relative efficiency of the stoker and the hand fireman. Several types of mechanical stokers have now been brought to such a high degree of development that there is no question about their reliability. The thought was commonly entertained at first that with stokers mechanically perfected they could be operated easily by anyone. However, it is now quite generally recognized that just as much intelligence on the part of both the fireman and the engineman is required to operate a stoker fired locomotive as was ever required for a hand fired locomotive. The manual labor is lessened but the results obtained will still depend upon the amount of skill and judgment displayed by the operator. The tonnage hauling capacity of a locomotive is easily determined but the efficiency of the boiler in the production of steam is not so readily ascertained and there is a feeling among some railroad men that capacity has been secured at the expense of efficiency. No report was submitted this year by the committee on mechanical stokers, but it is hoped that it will be able to carry on a series of tests in the near future which will enable it to submit at the next convention facts in regard to the relative efficiency of hand and stoker firing. This would be an important and welcome addition to previous reports.

Efficiency of Stoker Fired Locomotives

The report of the Committee on Specifications and Tests for Materials reflects considerable reluctance on the part of the railroads to make extensive use of heat treated steels. There are at least two good reasons for the slow progress which has so far been made in the use of this class of materials for locomotive forgings. First it has been found that these steels are very sensitive to slight variations in the physical treatment to which they are subjected in the shops. The slight localization of stress resulting from a tool mark or surface scratch has been sufficient to start the development of detail fractures. Changes of section with sharp corners or fillets of small radius have had similar results. This sensitivenes to slight variations in the physical condition of the metal and a similar tendency of heat treatment to exaggerate the effects of segregation in the chemical composition of the metal tend to reduce the life of heat treated parts which are subjected to vibrations and heavy reversals of stress, if full advantage is taken of the increased elastic limit in proportioning the parts. Considerable doubt, therefore, remains in the minds of many railroad officers as to the safety of relucing the weight of parts as far as the physical properties of the material would seem to make possible. Second, few railroads are equipped with the facilities necessary to work heat treated material and restore it to its original condition. This does not apply to so great an extent in the case of axles and crank pins as in the case of rods, which frequently require straightening. But axles and crank pins, after they have been removed from service, are usually worked up into some other usable form. Here it becomes necessary to subject the material to heat in the shop and there are not many railroad forge shops equipped with the facilities or with the knowledge of the materials they are dealing with, necessary properly to control the temperatures in such operations. These considerations suggest that the possibilities are greater for any alloy steel, the working properties of which are developed by a simple annealing process, than for those steels which require treatment by the quenching and tempering process.

The Use of Heat Treated Steel

R. S. M. A. Committee Appointments

CHARLES W. BEAVER, the newly elected president of the Railway Supply Manufacturers' Association, announced the following committee appointments before leaving Atlantic City:

Exhibit Committee: W. H. S. Bateman, chairman, The Parkesburg Iron Company; S. H. Campbell, Western Railway Equipment Company; George W. Denyven, George W. Denyven & Co.; G. E. Ryder, The Superheater Company; and George T. Johnson, Buckeye Steel Castings Company.

Finance Committee: John M. Gillespie, chairman, Lockhart Iron & Steel Company.

By-laws Committee: George L. Morton, chairman, Galena Signal Oil Company; L. B. Sherman, *Railway Age;* and Charles C. Castle, National Railway Appliance Company.

Hotel Committee: W. K. Krepps, chairman, Crucible Steel Company; and Charles C. Castle.

Badge Committee: L. B. Sherman, chairman; and T. D. Kingsley, S. F. Bowser & Co.

Entertainment Committee: C. W. Floyd Coffin, chairman, Franklin Railway Supply Company.

Enrollment Committee: F. H. Smith, chairman, Gold Car Heating & Lighting Company.

Transportation Committee: H. E. Daniels, chairman, West Disinfecting Company.

Canadian Representative on R. S. M. A. Executive Committee

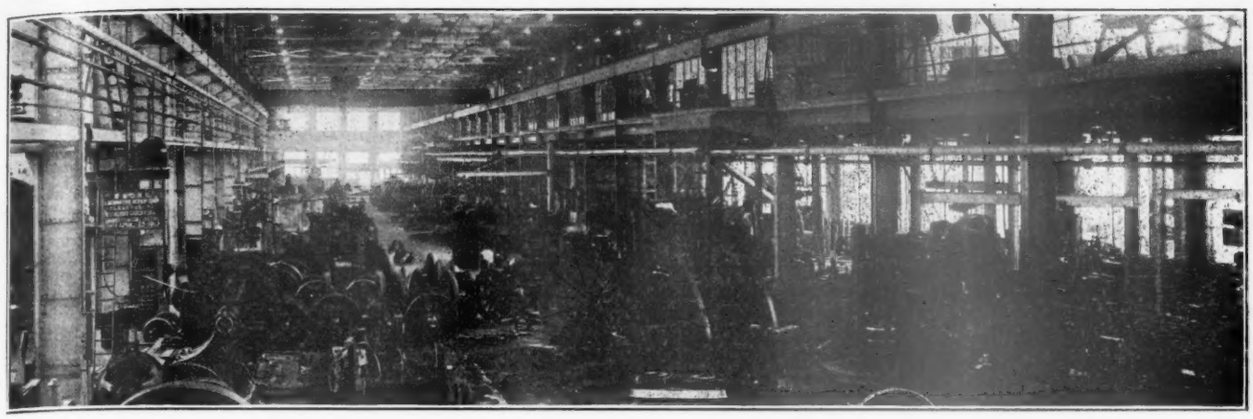
THE RAILWAY Supply Manufacturers' Association has decided to add another member to its executive committee representing what will be known as the Eighth District, including all of Canada. That country has never been officially represented on the executive committee, although the supply interests from that country have always participated cordially and heartily in the work of the organization.

Arthur Allen, vice-president of the Holden Company, Ltd., has been elected as the Canadian representative for a term of three years.

Record-Breaking Registration

THE FINAL comparative figures for the registration at the 1922 and 1920 conventions are surprising in many respects. The total registration is considerably larger this year than two years ago. There were fewer supply men and supply ladies at the meetings this year, but this decrease was more than offset by the increase in the number of railroad men and their families who were registered. There were 2,339 railroad men registered this year as against 2,024 last year. It is interesting to note that the total number of railroad men and the total number of supply men were almost identical this year.

	1922	1920
Div. V—M. M. and M. C. B.	1008	875
Div. VI—Pur. and Stores	384	364
Special guests	947	785
Supply men	2304	2575
Railroad ladies	1036	798
Supply ladies	575	676
Total	6254	6073



American Railway Association—Division V—Mechanical

Report on Design and Maintenance of Locomotive Boilers Brought Lengthy Discussion

Chairman Coleman called the meeting to order at 10 a.m.

Design and Maintenance of Locomotive Boilers

In an interesting comparison of the radial stay and Belpaire types of boiler construction, the committee draws the conclusion that for a given diameter of boiler shell the Belpaire type has the following advantages: (1) greater steam storage space; (2) greater steam disengaging surface; (3) greater firebox heating surface; (4) greater number of tubes, and (5) all vertical stays of uniform length.

The committee has done considerable work in canvassing the dry pipe situation with a view to determining the possibility of substituting commercial pipe sections for the special sections now frequently specified and presents a table of proposed commercial sizes to meet this condition.

The committee makes the following definite recommendations: 1. Buttonhead staybolts be adopted as recommended practice for crown sheets in other than oil-fired boilers; 2. The proposed pipe sizes be adopted as recommended practice for dry pipes in designing new boilers; 3. The practice of autogenous cutting and welding be further developed; 4. Hot water washout systems be adopted as recommended practice in washing and testing of locomotive boilers; 5. The installation of water treating plants be generally adopted in the bad water districts; 6. Improvement be made in the usual form of tapered screw washout plugs.

Design

THERE ARE TWO general styles of locomotive boilers at present being applied to locomotives in this country, the Belpaire and the radial stay.

The radial stay type of boiler was preceded in use by the crown bar type. As the demand for larger boilers and higher pressure took place, the weight of bracing necessary to support the crown sheet became excessive, increasing the difficulty in washing out and keeping the crown clear of sediment, due to the obstruction of crown bars.

In the earlier style of radial type the crown sheets were so much arched that it was possible to apply only two center rows of radial stays with buttonheads to bear squarely against the under side of the crown sheet, and the angle of the stays was such that the heads of the outer rows would not bear squarely against the under side of the crown; the end through the outer shell was at such an angle that is was impossible to get a continuous full thread fit within the thickness of the shell sheet, resulting in leaky staybolts.

In the later designs of radial stay fireboxes the crown sheet was very much flattened, permitting the application of buttonhead stays to approximately the full width of the crown. In the first design of radial stay fireboxes, in order to get the number of flues to correspond with those used in equal size crown bar boilers, the crown was carried higher than in the crown bar boiler, resulting in restricted steam space. In flattening the crown sheet, the steam storage space was increased, but the firebox heating surface reduced as compared with the earlier designs.

In the Belpaire type, the outside and inside firebox sheets are arranged with the surfaces of sheets practically parallel, permitting the application of braces at right angles to the plate supported, thus giving maximum fit for the threads of the stays or sleeves in the sheets and enabling the use of buttonhead stays through the full width of the crown.

With the Belpaire type, a given diameter of the boiler shell gives: (1) greater steam storage space, (2) greater steam disengaging surface, (3) greater firebox heating surface, (4) greater number of tubes, (5) all vertical stays of same length which results in less variation in expansion and contraction, less distortion of shell sheets, less breakage of bolts, and less number of staybolts to be kept in stock for repairs.

Since the history of boiler design shows that the firebox crowns have been shaped to provide for the application of buttonhead crown stays for the support of the crown sheets, the committee feels that this type of stay as shown by Fig. 1 should be adopted as recommended practice for other than oil-fired boilers.

Mud rings with drop corners, Fig. 2, are worthy of consideration. They can be easily made since it is the almost universal practice to use cast steel mud rings. This strengthens the corner of the mud ring, and provides for three rows of rivets, one row fitting into the thin sections of the mud ring which will draw the sheet tighter to the mud ring and give better backing up when caulking the edge of the sheet than is the case when patch bolts are used in the corner.

Consideration should be given to provide protection for return bends of superheater units. No design other than the ordinary

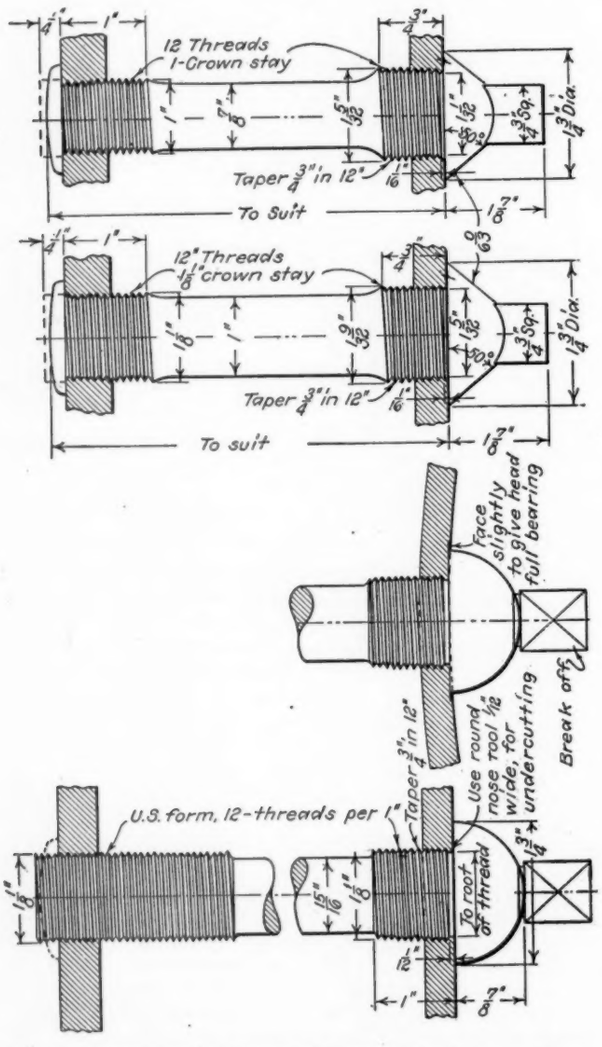


Fig. 1—Recommended Form of Button Head Crown Stays

damper appears to have been developed or at least are not within the knowledge of this committee. In this connection protection to the superheater units could be obtained by locating the throttle between the superheater and the engine, and developments along this line should be considered.

Improvement should be made in the usual form of tapered screw washout plugs threaded directly in the shell of the boiler. It would be desirable to design a screw plug wherein the plug proper was not screwed directly into the shell of the boiler and the cap or plug should be so designed as to eliminate the possibility of crossing threads in screwing to place.

Dry Pipe Specifications

Some communications have been had with the National Tube Company with a view of determining on dry pipe dimensions which would eliminate special sizes now required to be rolled for locomotives, thereby enabling the manufacturer to fill orders from pipe in stock, which would facilitate making prompt shipments for both new work and repairs.

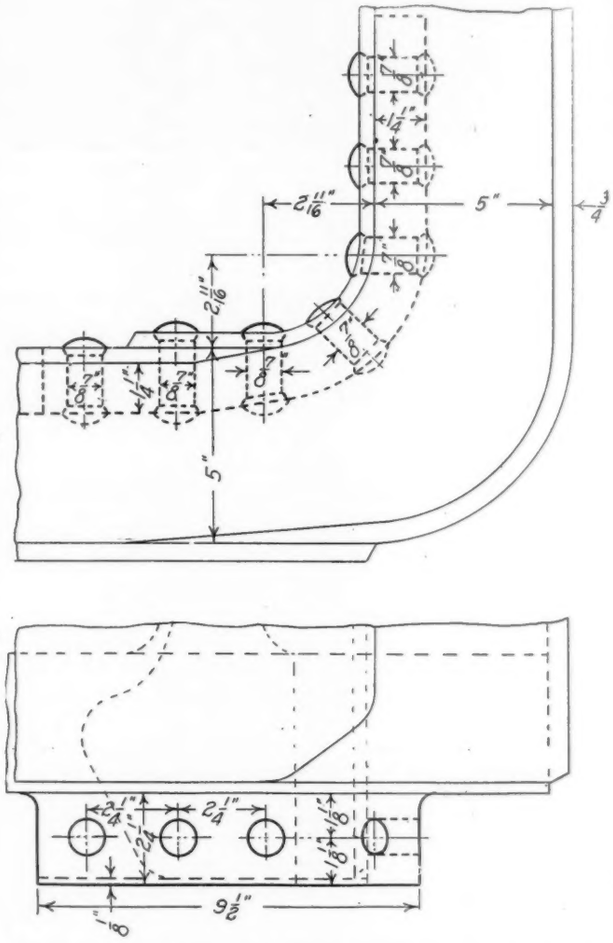


Fig. 2—Drop Corner Mud Rings are Recommended by the Committee

The dimensions of dry pipe most commonly used are shown in Table 1. The information was supplied by the manufacturers from sales of pipe during 1919.

TABLE I—DIMENSIONS OF DRY PIPE MOST COMMONLY USED

Outside diameter in.	Thickness in.	Outside diameter in.	Thickness in.
4½	¼	7	.180
5	¼	7	5/16
5½	¼	7	.300
6	¼	7 3/4	3/8
6	.180	7 3/8	.300
6	.300	8	¼
6	3/8	8	6/16
6½	¼	8	.165
7	¼	8	.180
7	8/16	8	.203
7	5/16	8	.300
7	.165	8	.284
		9	¼

The nearest to the outside diameters of pipe and casing which are customarily ordered are shown in Table II.

TABLE II—PIPE AND CASING SIZES

Pipe size in	Pipe Outside diameter in.	Pipe Thickness in.	Casing Casing size, outside diameter, in.	Casing Thickness in.
4½	5	.247	5	.152
5	5.563	.258	5½	.154
6	6.625	.280	6	.164
7	7.625	.301	7	.174
8	8.625	.227 or .332	8	.186
9	9.625	.342	9	.196

The casing diameters of standard weights approaching the heaviest demand for 5-in., 6-in., 8-in. and 9-in. outside diameter dry pipes are shown in Table III.

TABLE III—CASING SIZES MOST NEARLY APPROACHING DRY PIPE SIZES

Outside diameter, in	Thickness, in.	Outside diameter, in	Thickness in.
5	.241 or .301	7	.231 or .275
6	.224 or .275	8	.236

In the 9-in. outside diameter the lightest standard casing is .196 in. thick, and, therefore, it would be better to have pipe size adopted in either 8⅝-in. or 9⅝-in. diameter. The 8⅝-in. would be either .277 in. or .322 in. and the 9⅝-in. outside diameter .342 in. thick.

We recommend that the sizes in Table IV be used for dry pipe and that they be adopted as recommended practice.

TABLE IV—PIPE SIZES RECOMMENDED FOR DRY PIPE

Present Pipe Inside diameter, in.	Thickness, in.	Outside diameter, in.	Proposed Pipe Nominal inside diameter, in.	Actual inside diameter in.	Thickness in.	Outside diameter in.
5	¼	5½	No corresponding size			
5½	¼	6	5	5.047	.258	5.563
6	¼	6½	6	6.065	.280	6.625
6½	¼	7	7	7.023	.301	7.625
7½	¼	8	8	8.171	.227	8.625
8	5/16	8⅝	9	8.941	.342	9.625
9	5/16	9⅝	No corresponding size.			

Consideration should be given to the design of cast iron dry pipes, in view of the present usual practice.

Boiler Maintenance

The renewal of firebox sheets is the principal expense in boiler maintenance. There has come into use the last few years, the gas cutting torch for cutting out, for removing defective parts, and autogenous welding for uniting plates.

The autogenous welding process is used for the application of patches to firebox inside sheets, of half and full side sheets, of crown sheets, of whole and part back flue sheets, of whole and part door sheets, of door collars and door hole patches, of mud ring corner patches, and of welded fireboxes complete; for reinforcing mud ring corners and rivet seams, and for welding broken mud rings. For other than fireboxes is used for welding outside side sheets, electric welding flues, welding cracks and holes and fastening studs.

The use of the autogenous system of welding brings with it so many advantages from the standpoint of decreased thickness of material and decreased cost of maintenance that it should be developed to the fullest extent possible, but at the present time the state of the art is not sufficiently developed to warrant the committee making definite detailed recommendations. Attention is called to the practices of the Baltimore & Ohio, Chicago, Rock Island & Pacific, Atchison, Topeka & Santa Fe, Union Pacific System and other leading railroads in the country, all of which have established practices well worthy of consideration which doubtless will be further developed.

Tools and accessories required in electric welding work are as follows: Electrode holders for metallic arc welding, Fig. 3, and welding cable. As far as possible portable welding cable over 50 ft. in length should not be used. Additional outlets should be provided when necessary to use longer cables. The condition of the insulation of portable cable should be watched and repairs made when insulation shows signs of breaking through. Bare spots in the cable may cause short circuits that will result in considerable damage. In welding, the surface should be kept clean, operators using brush for this purpose.

In the majority of shops and roundhouses the track rail is used as a part of the circuit for welding current. When welding work on unwheeled locomotives, tanks, boilers or other metal parts supported on wooden blocks, the electric circuit between the work and the rail is to be made by the use of "ground" cables, as shown on Fig. 4. In attaching these cables for work on which welding is to be done care must be taken to see that a good electrical contact is secured between the end of the cable and the work, the connection to be made as near as practicable to the point at which welding is to be done. Where carbon arc welding is to be done at least three No. 2 A. W. G. ground cables should be used. Poor electrical contact can be detected by excessive heating and should be corrected when found. For these ground cables welding cable on which the insulation has badly worn may be used.

Welding operators should be fully familiar with starting and stopping of welding motor generator sets, regulating voltage or adjusting current to give the desired amount of heat, etc. The welding electrode is to be connected to the negative side of the circuit which is taken care of in the permanent wiring where a ground rail return circuit is used. A short steady arc should be held, maintaining approximately ⅛ in. between end of electrode and the work and with sufficient current to insure a uniform flow of metal and producing at least 1/16 in. penetration. With clean

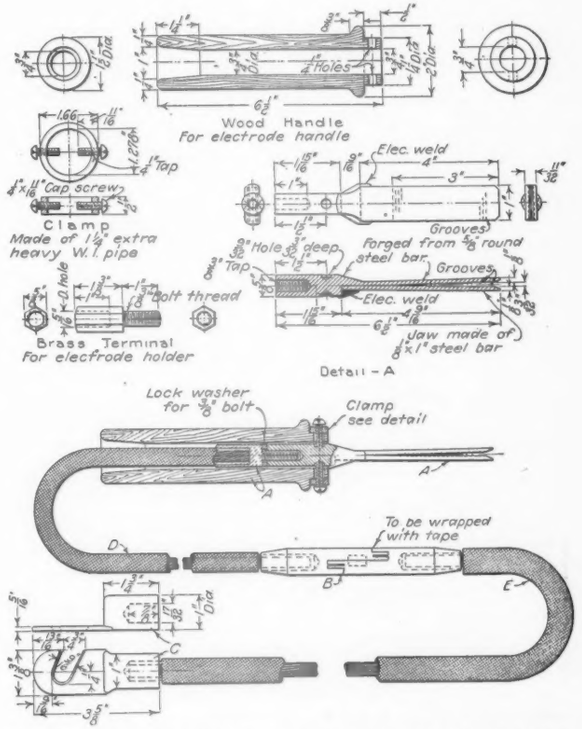


Fig. 3—Electrode Holder and Cable for Use in Welding

surface and other conditions correct, if the current is too low the electrode will melt slowly and quietly and will not unite properly with the work, while if the current is too great the electrode will melt rapidly, the arc biting deep into the work, producing a hissing sound and the deposited metal tending to boil, giving a porous appearance.

When a welding operator is through working he should disconnect all cables, return them to their proper place and open those switches governing his work.

Carbon arc welding can be done only with welding generator sets of 600 ampere capacity or larger. Where 600 ampere capacity set is used for carbon work, only the operator doing this work can use the machine at one time. Welding circuits, panels, welding cables, electrode holders, etc., must also be of sufficient capacity and suitable for this character of work. In this connection sufficient capacity in the welding panels and permanent wiring can be secured by operating two panels and circuits in parallel. Portable welding cable of the size specified on Fig. 3, for carbon arc welding, should be used, but where this is not available, two cables connected in parallel of the size used for metallic arc welding can be used.

In electric welding there are certain general rules which should be observed. For welding, the pieces are to be kept thoroughly clean and free from grease, rust, scale and other foreign substances. Places that are not chipped clean in beveling should be cleaned at least one-half inch on each side of the bevel.

Never apply a weld to the barrel of the boiler. Never weld studs

to the barrel of the boiler. Autogenous welding should not be permitted on any part of a locomotive boiler that is wholly in tension under working conditions; this includes arch and water bar tubes.

Water Treatment

An important factor in the cost of boiler maintenance is the quality of water used, and we can not emphasize too strongly the desirability of furnishing the best possible, by which we mean water free from suspended matter, corrosive and scale-forming substances and as low as may be in alkaline salts.

Scale and corrosion greatly diminish the life of a boiler, which with the expense of repairs is largely dependent on the amount of impurities in the feed water. In districts where good water is available, flues and sheets readily last the legal limit, but when water high in scale-forming substances is used the life of the flues is reduced to less than one year. In this latter case frequent

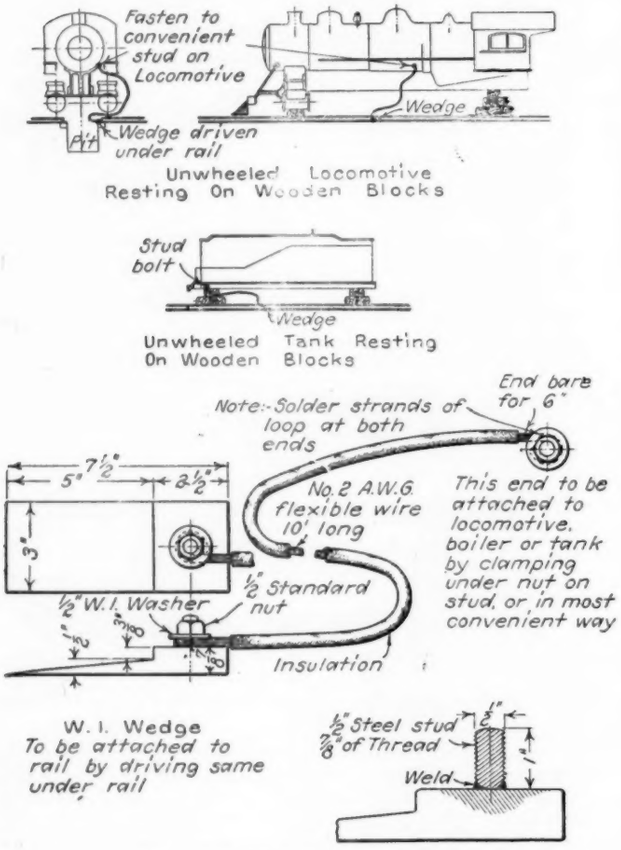


Fig. 4—Ground Cable and Its Use

washing is necessary, sheets leak around flues and bolts and the repeated working and caulking and the bombarding in the effort to remove scale keep the locomotives in shop a large part of the time and result in premature failure and relegation to the back shop for classified repairs.

When natural waters of good quality are not available, those of poorer quality should be given treatment to improve them and emphasis should be given to the conclusion that the effectual way to prevent the formation of scale is to remove the impurities in properly designed and operated plants, before the water is introduced into the boilers. The results of such pre-treatment are so well-known that it is not necessary to quote figures here, but it may be noted that the installation of treating plants in hard water districts offers an investment that will show a big return by reducing the cost, not only of boiler maintenance, but also of general operation.

The committee strongly urges the serious consideration by the railroad management, the installation of water treating plants.

Circulation

The committee urges the careful consideration of the design of boilers to the end of perfecting circulation of water.

Feed Water Heaters

The Committee is of the opinion that attention should be given to the further development of feed water heaters in order to effect more economical operation of locomotives.

Boiler Wash-Out and Fill Systems

The cost of boiler maintenance can be very materially kept down and the maximum efficiency of the boiler more nearly obtained by the consistent use of hot water washout and fill systems. In the use of hot water, in order to be effective for the loosening of scale and washing out mud from the interior of the boiler, it should be under a pressure of about 130 lb. per sq. in., and at a temperature of about 150 deg. F. This force and temperature will quite effectively remove scale and clean the boiler.

There are three general types of washout and fill systems in use.

1. The ejector type, in which washout water is slightly heated and placed under pressure by injecting steam into it through a suitably designed nozzle. This is the simplest and least expensive type, but appears to be the least desirable.

2. The pump and heater system, where the water is heated in an open or closed heater, distributed through a pipe line in the engine house and forced under a pressure of about 130 lb. into the locomotive through a hose and nozzle. This type is fairly effective and can be installed without violating any patent rights. For a medium sized terminal, such a system with two water tanks, one washout and one filling pump and two pipe lines into the engine house, will afford washout water at 150 deg. and filling water at 200 deg. F. at a small operating expense. Where exhaust steam is available for heating water, this type is an excellent one for a medium sized terminal.

3. The blow-back type, where the steam blown off the locomotive is utilized to heat the wash and filling water. Such systems which also provide for the automatic tempering of the water used in washing out and the use of a circulating line to keep the water always hot in the engine house lines, are protected by patents. This system is the most effective one, and provides washout water at all times of the proper temperature, and reused water and steam blown off from the locomotive instead of washing it.

The committee earnestly urges upon the management of the railroads the importance of installing hot water washout and fill systems, thereby effecting economies and efficiency with little expenditure of capital.

The report is signed by: G. H. Emerson (Chairman), B. & O.; C. B. Young, C. B. & Q.; A. W. Gibbs, Penn. System; J. Chidley, N. Y. C.; R. W. Bell, Illinois Central; W. H. Wilson, Northern Pacific; W. W. Lemen, D. & R. G. W.; R. J. Williams, Pere Marquette; J. Snowden Bell, and Geo. L. Bourne, Superheater Company.

Discussion

In the absence of Mr. Emerson, the report was presented by O. C. Cromwell (B. & O.), who said at the conclusion: Since the preparation of the report there have been some improvements made in the design of locomotives along the lines brought out by the committee. Locomotive No. 8000 has been recently put in operation on the Michigan Central with quite a number of the features mentioned. The circulation is improved by introducing a large radius corner in the back mud ring. This allows a free entry of the water and should increase the circulation.

The throttle valve is located in the smoke box, so as to control the steam after it has left the superheater. By that means you keep the superheater units under steam at all times which should afford protection and give a short steam area between the throttle and the cylinder. The outside by-pass is fully under control.

These features show that the mechanical world is interesting the railroads in the matter of boiler design. The railroads realize the importance of bringing about improved circulation and steam generating qualities; also more economical use of the steam.

As to circulation you know that there are a number of

circulating devices in the market but as they are patented, no specific mention is made of them in the report. They all tend to improve the circulation and I believe there are going to be further improvements in that direction. Feed water heaters are coming to the fore quite rapidly, a number of different designs having been tried out which no doubt in a short time will indicate the direction in which this very much sought-for device will be developed.

H. H. Lanning (Santa Fe): The committee has recommended that button-head staybolts be adopted as standard practice for crown sheets of other than oil fired boilers. On railroads which operate both coal and oil burning locomotives, it is desirable to equip all locomotives with a type of crown stay that will give satisfactory service with either of these fuels, as it is inconvenient and expensive to renew all of the crown stays in a firebox when the locomotive is changed from coal to oil or vice versa. This change is frequently necessary as a result of transfer of locomotives or changes in the relative prices of oil and coal.

The service conditions on an oil burner are more severe than on a coal burner and it is to be expected that a railroad which has both coal and oil burning locomotives should adopt for all locomotives the type of crown stay which gives best service with oil; namely, one having an upset taper threaded head on the firebox end. These bolts are applied with the small end of the taper toward the water side of the crown sheet. The taper is usually about 1 1/2 in. in 12 in. and, after being screwed into place the firebox ends of the bolts are cut off and riveted over.

Radial stays and crown bar bolts of this type were developed on oil burning locomotives in bad water territory as a means of overcoming very serious trouble experienced with crown sheets of the button head type. They have been in successful and extensive use under these severe conditions for 15 years or more.

When subjected to the extreme heat of an oil fire or to a very hot coal fire in a locomotive using bad scale forming water, the round heads of the button head bolts became overheated and gave trouble. The head of the bolt presents an enlarged area to absorb heat from the fire and a large part of the heat thus absorbed must be transmitted to the crown sheet through an intervening layer of dirt and scale and to the water, through an accumulation of mud or scale adhering to the bolt and to the sheet. The result is that, in an oil burning engine and sometimes in the hottest part of the firebox on a coal burner, the button heads become overheated and leak.

The taper head type of crown stay presents a smaller area to the fire and does not absorb so much heat. The contact between the bolt and the sheet is more intimate and the transference of heat from the bolt through the sheet to the water takes place with less interference The taper head bolt has a further advantage that in case it does show a tendency to leak, it can be restored to a perfectly tight condition by a small amount of hammering.

On coal burning locomotives using certain kinds of coal the taper head radial stay accumulates practically no honeycomb or clinker, while under the same conditions crown stays of the button head type would collect considerable quantities of this material.

Fifteen years or more experience with crown stays of the taper head type in oil burning service and about seven years experience with this type of stay bolt in coal burning service on a railroad, having over 2100 locomotives, has demonstrated that the taper head crown is fully as safe under favorable conditions and is safer under conditions of extreme firebox temperatures than the button head type of crown stay. Taper head bolts have also been found to give better and more satisfactory service than button head stays on coal burning locomotives as well as on oil burners.

I feel that the committee should be requested to give consideration to crown stays of the taper head type for both oil and coal burning locomotives and include this type of stay among those recommended for adoption by this body.

C. A. Seley: I was under the impression that the success of the taper head radial as developed for oil burners would set the pace for its use in coal burners as well, because of its manifest advantages in cost, application and maintenance. The great difficulty in making the thread of a buttonhead bolt fit tight in the sheet simultaneously with a fit of the button against the sheet leads to much imperfect work and subsequent leakage and caulking that strains the section under the head. The heating of the projecting head tends to break the caulking joint and has an affinity for some products of combustion that form clinker.

That I am not alone in my opinion was shown by the 1921 report of the Master Boiler Makers' Association which strongly endorsed the taper head radial for all classes of service after making tests and comparing results of service. The Boiler Makers at their recent convention of 1922 supported the report of the committee.

In the interest of economy of material and reduction of boiler weight at the most advantageous point I would question the body diameters as shown in this report. The I. C. C. rule for 7,500 lb. maximum stress of stays applies to radials as well as water space stays and this figure is supported in the Boiler Code of the A. S. M. E. With 4 in. by 4 in. spacing the diameters named would carry 281.8 lb. for 15/16 in.; 323.5 lb. for 7/8 in. and 368 lb. for the 1 in. body, all of which seems excessive.

In his opening address at this convention, Chairman Tollerton forcefully urged consideration of fuel savings and other economies in operation, and in line with this the committee urges careful consideration of the design of boilers to the end of perfecting circulation of water. Just what and why is this circulation? A brief definition would be the movement of boiler water in its conversion to steam, and the perfecting called for is an implication that the present designs and state of the art not perfect and need further consideration.

It is obvious that the circulation should be sufficient to do two things; to serve as a wiper-off and carrier of the steam bubbles as formed on the heating surfaces for prompt discharge into the steam space, so that the full value of these surfaces may be realized; also to so mingle and mix the boiler water as to have no extremes of temperature. The maintenance of a relatively large volume of highly and uniformly heated water will promote reduction in maintenance and increase the effectiveness in operation.

The arch tube came as a life saver when boilers were assuming lengths to accommodate wheel arrangements necessary for development of increased traction, and wonderfully stimulated the circulation of the increased volume of water. Its very extended use has certified to the correctness of the theory that getting close to the source, taking advantage of initial conditions, is the proper method of solving this important problem. What might have been regarded as an incidental advantage, aside from the use of the tubes as brick arch supports was, in my belief, the most important factor, ont only in the use of the tube but due to the tube being in the firebox and directly subject to the only motive power which can promote circulation aside from outside mechanical means.

For the actual production of steam, the firebox of the locomotive is a very vital feature in its arrangement and proportions. Each square foot of its surface is five or

more times as valuable as flue heating surface, for the simple reason that there is conduction and radiation of heat from the combustion of the fuel imparted to all parts of the firebox, but these combustible gases are extinguished on entering the flues with a reduction of temperature below the point of ignition. There is now no radiant heat, simply that of convection or rubbing of the flue surfaces by hot gases, and notwithstanding the short travel through thin walls of the tubes as compared with firebox plate thicknesses, the results are not high in evaporative efficiency, particularly at the forward ends of long flues.

To obtain a further increase of circulation, as desired by this committee, let me call your attention to a device which has been through some years of development;—an American invention, of which mention was made at the recent convention of the International Railway Fuel Association as follows:

"Results of tests conducted during the last four years on a number of railroads demonstrate that this device has passed the experimental stage and will probably be one of the standard fixtures in the locomotive of the future, as is the arch tube at the present time."

The Thermic Syphon is fulfilling the requirement of the committee for a circulating medium of adequate promise. It is a further development of the arch tube principle, serving as an arch support and its capacity for increasing the water circulation is shown by the fact that the throat connection of two syphons has a waterway approximately three times as large as four 3 in. tubes; that the upper or discharge openings in the crown sheet are 3 in. wide by such a length as to give approximately ten times the areas of the lower connections, providing a quiet release of the upward circulation, and a direct upward path for steam bubbles, without chance for pocketing which would permit incrustation. The entire outer surface of the syphons are additional heating surface of highest value, due to their location in the hottest zone of the firebox, and by the generally increased water circulation effect of the syphon, the heating surfaces of the fireboxes and flues will be further stimulated to higher evaporative effect, facilitating deposit of boiler feed impurities to convenient washout points. Each syphon is in effect a double plate girder, longitudinally strenthening the crown sheet, dividing the stream of gases for more favorable absorption of radiant heat and subdividing crown sheet into limited zones, and preventing boiler explosions. This is proved in two cases of extreme low water.

Tests of syphon engines as against like engines not so equipped show coal savings running from 14 to 25 per cent per thousand ton miles; on oil burners 8 to 10 per cent.

J. A. Pilcher (N. & W.): I wish to speak simply with reference to Fig. 8, referring to crown stays and heads, reinforcing what has been said by the two previous speakers. We have eliminated the button head stay bolts in favor of stays with a large taper. Our boiler repair people have found it entirely advantageous and I was wondering just how far the committee investigated this particular feature of boiler construction before making their recommendation for the use of the button head stay throughout the firebox crown. I also notice the very decided recommendation of the crown sheet of the Belpaire type. On the road with which I was connected in the early days they used the Belpaire, but for some reason they deserted it. I wonder why? They have named many good points. I wonder if there are any bad points explaining why this type has not been more generally used.

J. Snowden Bell: Mr. Seley has given us a very interesting statement and a valuable one. I think there is nothing in it that I differ from in the least degree. There are one or two questions, however, I would like to ask. One is a good deal a matter of personal curiosity, I may say. He has referred to this device called the thermic syphon. I would like to know why they call that thing a syphon. As far as I understand it, it has not any syphonic action whatever. There is nothing resembling a syphon present there. I have no doubt that the results of tests will show that the advantages derived from an increase of firebox heating surface secure probably a better circulation with that device, but I do not know why that should happen any more than it would with the old style water legs that were introduced in 1837 in the British practice by McConnell and others. This, as I understand it, is simply a water leg or rather two water legs. They get an increase of fire box surface, the value of which we all know but you would get it with any longitudinal water wall in your firebox and so far as the circulation is concerned, I cannot see why the circulation of that device would be better than the improved circulation obtained by an ordinary mid-fellew or longitudinal water wall in the firebox. (That is what I would like to hear from Mr. Seley, if he can explain.)

H. T. Bentley: I was very surprised when I read the report of the Committee on this button-head staybolt, because I thought it was a thing of the past. For years we were having lots of trouble in oil burning service with button-head staybolts and we looked around to see what could be done to overcome that trouble. By going to the taper head our difficulties were entirely overcome and we thought if it was a good thing in oil-burning locomotives, it was not a bad thing in any other service. About 5 or 6 years ago we made it our standard and since then we have been entirely satisfied with the results obtained. The conclusions of the committee generally are in accordance with my idea of things, particularly in regard to the hot water washing out. It is unfortunate that financial conditions have prevented the extention of hot water washout plants, but apparently very little has been done in the last few years. I am also in favor of the installation of water treating plants. I think everybody will agree that there is always a difficulty, when business is good, in getting boiler makers. If you can get a supply of water that overcomes the necessity of using so many boiler makers, it is certainly a move in the right direction and I am sorry that conditions have been such that little has been done in treating water to save work in the boiler shop.

I know of some railroads which, unless something is done and done very quickly, will have to enlarge their boiler shops and put in more machinery and tools for handling boilers. It seems to me that we are a little shortsighted when we do not prevent the disease rather than to try to cure it after it has developed.

C. F. Giles (L. & N.): I note in the committee's report under the caption of water treatment that they strongly urge the serious consideration by the railroad managements of the installation of water treating plants. They make no mention of a practice in effect on a number of railroads of using the internal treatment. We all know that the installation of a water treating plant is a very expensive proposition and must necessarily be confined to a point where they are troubled with bad water. If they have bad water at more than one point on a division, they must necessarily install water treating plants at every point where the water is bad.

It is a well known fact that the water on a division, or a series of divisions running out of a given terminal, can be analyzed and proper chemical preparations will take care of the water as a whole, avoiding treatment of the water at each particular point. The internal

treatment is being practiced on a great many railroads. We have made some experiments with it ourselves with splendid results. It is a much less expensive way of taking care of bad water in some cases than the wayside treating plants. Besides that, at times when the water is exceedingly bad resulting in foaming, you may necessarily have to resort to the internal treatment to overcome the external treatment of water. In my opinion the committee should during the next year give some consideration to the internal treatment of water.

J. Snoden Bell: I would like to ask whether there is anyone present, who knows about the application to the Lima locomotive of a throttle valve between the superheater and the cylinders. It was the concensus of opinion of the Committee that that was a proper location for the throttle valve, but I would like to know if any other road has made a similar application, and if so, with what results.

C. E. Fuller (V. P.): There seems to be a difference of opinion here this morning. It is said that doctors never agree and I think in this case we are not agreeing.

The commitee has recommended the adoption of button-head stays and I can fully endorse the Committee's recommendation from the results actually gained through experience in operating locomotives with button head stays. I have not had experience operating locomotives with oil and I appreciate the difficulties that might be encountered in such cases, but it is my opinion that the question of button-head stays, versus tapered, driven stays for the crown sheet is a matter of local conditions more than anything else.

We have had no trouble with button-head stays; that is, our standard form of stay. We have used them for years and if they are properly applied and maintained there is no trouble.

We do not have to resort to any caulking of the button-head stays. I am inclined to the opinion that those who have had trouble with the button-head stay have not arrived at the cause of the trouble by a proper inspection.

Mention is made of the button-head stay collecting scale and mud. It will do this. The committee, of which I am not a member, states that the bombarding of sheets to loosen the scale puts the locomotive into the shops for repairs quite frequently. I do not believe that there is any road which has done more bombarding than we have; I think that we were the orginial bombarders of crown sheets. We have many locomotives in certain sections, where we would otherwise burn the crown sheet out in less than a year, but if they are bombarded, properly and frequently, there will not be any trouble. We have been doing it for years but with the proper tools and in the proper way and have been able to keep staybolts fairly free from mud even in a bad water district.

The committee in this report also mentions the treating of water. Before water is treated, it should be very carefully analyzed and an effort made to determine what is wrong with it; we have waters which are of such a character that they will not stand treatment; that is, in the tank. The condition of water requires careful study and I do not believe that the experience of any one railroad will be of much value with regard to treating of water on another road.

If I were selling water treating plants, I would probably tell you to treat your water but what I would personally advise is to investigate the matter and discover what is really the difficulty. There is no cure for all ills. When you find out what is the matter, you are in a better position to proceed to the question of water treatment. Then you can handle the subject of water treatment in the most intelligent way.

We can afford to spend a large amount of money to get good water and if we can get it, with or without any kind of treatment, we can close up our boiler shops to a very large extent and will have successful locomotive operation.

In the case of certain waters on our road, we have to put castor oil compounds in the water in order to keep the water down. We have our troubles keeping it in the boiler. We could not treat that water if we wanted to.

W. F. Kiesel, Jr. (Penn.): I would like to add something in conection with the button-head stays. We have used them for many years and we find them the safest stay to use. An engineer may at times disregard the condition of the water in his boiler and there will actually be low water in the boiler. The buton-head stay, under such conditions, is the safest.

In the case of wagon-top boilers, objection is made to the use of the button-head stay because the stays will not go in at an angle and you cannot make a square seat very readily, but even in the wagon-top boilers the 3 or 4 rows in the center may be made of button-head stays to good advantage.

Mr. Pilcher asked what the advantages of the Belpaire boiler are: The committee recommended a Belpaire boiler and although I am not on the committee, I can readily see why—because the stays are normal to the sheet. You can use a stay with a head or you can use a stay such as proposed by some of these other members; furthermore, it is a more flexible job and expansion and contraction will put less stress in the sheets. Also you know more definitely what the stresses in the sheets are. It, of course, requires more time and the builders will be opposed to it on account of the increased cost of dies, but the Belpaire boiler is considered the safest both in Europe and in this country.

R. D. Hawkins: (A. C. L.): The button-head staybolt does not seem to have very many friends here. While on the Atlantic Coast Line where we have used the taper head stay for many years I had experience with the Belpaire type of firebox. It is very easy to apply button-head stays and I must say that I favor button-head staybolts in this class of boiler. We are having some very satisfactory results with a taper stay but I do not like to see the committee turned down entirely on its recommendations of the button head. I have also had some experience with button-head staybolts in oil burning engines. We had some difficulty where we used large heads and the heads started to burn. In this case we made a hollow tool and kept the button heads smoothed off thus getting very satisfactory results, even with oil.

C. E. Chambers: I have had experience for 20 years, at least, with button-head staybolts or crown bolts. With locomotives built recently we went to the use of the taper-head crown bolt, but not because of any trouble of leakage or being unable to keep button-head bolts tight. There was one reason that prompted me to do this. Possibly somebody else in the room has had a similar experience. We had a great many crown sheets equipped with button-head crown bolts which, while the sheets looked perfectly good, were badly grooved around the head of the bolt. Water conditions could not be blamed so I thought perhaps the heads of the bolts became overheated, or that the circulation from the water did not protect the sheet at that point as thoroughly as it would without the button-heads. That was really what prompted me to go to the taper crown bolts.

A. W. Kelly (National Tube Company): I just want to say a few words in connection with the dry pipes. We have had a great deal of trouble with the railroads because of filling orders for dry pipes as mentioned in No. 1 and No. 2. Many different orders come in and that

means we have to change rolls, causing delays. Oftentimes we have had to substitute seamless dry pipe which costs more money. I think the committee's recommendations are right. They will allow the tube manufacturers to carry standard sizes of pipes in stock, so there won't be any delayed deliveries.

Mr. Seley: I would like to answer Mr. Bell's objection to the term "syphon." I rather think there is a syphon there. It may be inverted from the ordinary syphon; it may be upside down, but it seems to me there is a distinct analogy in that term. The water from the boiler barrel being drawn there by its greater weight displaces the lighter water forms a syphon and assists in the circulation.

As regards the water leg idea, I haven't any reason to doubt that any water leg of the same heating surface measurement would be just as effective, but in the design which is under discussion, these are most advantageously arranged for meeting the direction of the flow. I think that the failure of most of these devices formerly used have been in the manner of making the connection to the sheets.

W. L. Robinson (B. & O.): It is very pleasing to note in the committee's conclusions that they have included items No. 4 and No. 5, which will bring about some fruitful results for something besides reduction of maintenance of equipment expenses. We ought to think about the C. T. saving obtained through carrying out recommendations No. 4 and 5, and increase the boiler washing periods from two or three days in certain districts to 10 or 20 days; also holding the fires longer, instead of knocking them out every trip for boiler wash or boiler work. The cost of fuel is a C. T. expense and so is roundhouse labor, boiler washing, etc. Your C. T. ratio may be affected two or three points by possible saving in fuel. If you have hot water washout systems and water treatment it means a saving in C. T. expenses. I want to bring out the possibility of making savings in the C. T. expenses as well as the M. of E. expenses.

J. Kruttschnitt (So. P.): Apropos of feed water purification, there is a piece of apparatus in use on the government railroads in Hungary which is located on top of the boiler and its purpose is to purify the water. If there is anybody here who is informed respecting that I think the rest of us would like to hear him tell what he knows about it.

Mr. Greenough: I am very sorry I haven't anything on that of an official nature at all, but it is probable that the location of those feed water heaters has had some influence on some of the feed water heaters recently applied by the Locomotive Feed Water Company. The apparatus referred to is, I understand, a purifier and the appara tus, made in this country is a feed water heater. I have not heard what the results of the purifier in Hungary amounted to.

Chairman Coleman: This is a very important paper, gentlemen, and in order for the committee to make some standard recommendation to you they must have the experience of all of the railways in the country. You are all operating your boilers under different conditions and the minute conditions change the committee must get an expression from each one of you. There is a great responsibility before you now in trying to economize in the operation of locomotives. The slogan is economy and efficiency and in order for your committee to draw up these papers and present them to you in an intelligent manner, covering the entire continent, they must have your experience.

Mr. Brooks: You are operating locomotives in the Canadian Northwest under the most extreme climatic conditions. The committee would like to know your experience.

C. E. Brooks: I hesitated to say anything about our experiences because they are evidently so diametrically opposite to the experiences of many others who have spoken here today. The first two speakers indicated that the button-head crown bolts had been abandoned for the reason that it could not be used with oil and that in order to standardize with one type of crown bolt for both coal and oil burning locomotives, it would be advisable to go to the sharp tapered type of crown bolt, which was mentioned. When we started oil burning about 8 years ago, we had the idea, gathered from various oil burning roads in the southern part of the country, that we had to have the tapered type of crown bolt. We installed this type of crown bolt in a large number of locomotives and our intention was to spread the use of this type of bolt throughout the coal-burning areas as well. The net result of the thing is that two years ago we had to abandon the tapered crown bolt and we are now using from coast to coast button-head bolts; not button-head, unfortunately, as per the recommendation of the committee, but with parallel thread button-heads. The reason we went to the use of parallel thread button-head bolt was that a tapered crown bolt of any kind can be made test proof without really being a good job; that is, it will meet a water test, whereas the parallel-thread crown bolt must be a fit in the thread in order to pass the water test of either the railroad shops or the manufacturers.

The second disadvantage that we found in the quick tapered crown bolt was the mechanical features in connection with the application of the bolt. That is the different type and sizes of taps required and the difficulties of aligning the thread in any way between the inner and the outer sheet. The next disadvantage that we found was that the large water area of the quick tapered crown bolt gave much greater possibilities for scale accumulation than the smaller diameter button-head type bolt.

The next disadvantage that we found was in cases of low water. We have some very remarkable photographs of cases of low water in the bad water districts of Saskatchewan where an entire firebox had pulled off the quick tapered bolts and simply turned the backs down in the form of a little ring, pulling off without destroying the bolt and without even rupturing the sheet, for the simple reason that, as the sheet started to corrugate, it lifted the thread. It got no support from the thread whatever and had nothing but the back. The photograph even showed the perfect thread on the quick taper. The reason for this is, we think, a succession of overheating of these bolts, due to what might be called ordinary low water conditions. That is, a condition where a man was working with water very low, as we do in certain areas, and was possibly caught a little. The bolt consequently was hammered up a little and in hammering on the back of a quick tapered bolt, your whole action is not an upsetting action. It is an action that destroys the thread in the sheet; that is, loosens it up and you depend upon nothing but the taper of the bolt to hold your sheet.

Now, with regard to two or three of the other items which have been mentioned here. We are not a Belpaire boiler road, but we are very much interested in the recommendations of this committee. We intend to be a Belpaire boiler road, as far as the big power is concerned, for the simple reason that the radial stay boiler, when we get into the large diameters and near our clearance limits, does not have the steam space for handling our light water. We figure we can get this from the Belpaire type of boiler and I believe it is going to be our standard throughout.

Regarding hot water washout systems, we are opposed to ordinary practice, to such an extent that I do not like

to mention it at this late hour. We are a cold water washout road, and furthermore we intend to be, in the bad water districts, cold water absolutely. The reason for that is that we believe the hot water washout system is, very often, hot water in name only. We cool our boilers down and know that they are cool; then wash them with water that the men can handle and wash them under conditions that give our men a possibility to inspect the boiler. At the same time, we figure that in reducing the temperature of the boiler we have some chance of keeping the scale accumulation in a condition where water pressure will remove it.

I have heard it mentioned today that item No. 5 is probably the greatest improvement that could be made. We are opposed to that, too, and for this reason: We believe that the solution of boiler trouble is by not using bad water. I can tell you of one case (and probably our friends south of the line can tell you of a great many more) where we were using terminal water in one of our busiest terminals than ran 25 grains of encrusted solids to the gallon. We abandoned that water which was well water, and by heavy expenditure it is true, we have impounded storage of 300,000,000 gallons of surface water, reducing our encrusting solids to probably 15 per cent of what they were in the well water. We intend to follow that principle of impounding water absolutely, abandoning wells and figuring on well water supply as a last resort.

Chairman Coleman: Mr. Wanamaker?

E. Wanamaker (Rock Island): I do not think I am in a position to make any remarks but I have been a very interested listener. Some years ago we began to study the water supply on the Rock Island and water treatment in connection with our fire box maintenance work. I am inclined to agree with Mr. Brooks and with the gentleman who spoke preceding him. If it is possible to secure a good water supply you have reached the ideal solution. In a few instances, at a considerable expenditure, we were able to do that; in others it was practically impossible. Then it became a question of treatment and we found then that we had mistreated more water than we had treated. Furthermore, when we treated the water situation at one water point, it made more trouble with the water supply at some other point, due to the fact that you take your water supply from various points. We have started a progressive or systematic method of handling our locomotive feed water supply in an endeavor to secure uniformity. By so doing, we have greatly decreased our M. of E. in many instances, and at the same time, reduced the C. T. charges, making an indirect saving in that respect.

As regards the hot water washout and fill up system, no doubt Mr. Brooks' statement is very true. If you have sufficient motive power to permit such practice in times of heavy business. In our case we have been able so to do and we feel that the hot water washout and fill up systems, when properly used and supervised, results in a tremendous saving in C. T. charges as well as M. of E. Occasionally we get a letter from somebody wanting to know how much money we have saved in our boiler washing practice. Of course our boiler washing increased the cost of washing boilers. The biggest saving that we made was in the increased number of engine hours in the service.

With regard to the locomotive syphon, we have had very good success. I think that the reserve factor, at least on a railroad such as the Rock Island where we have many short hills, has enabled us to take a heavier train over the divisions, and not only keep up our schedule, but make up time that was lost. Sometimes on a division run of 165 miles, we could make up 24 or 30 minutes with heavy trains. It seems that our savings have to be predicated on the efficient and economic handling of the train, rather than based on the locomotive alone. I believe that one reason for our fair success with the locomotive syphon has been that we spent a great deal of time and effort designing the method for welding or attaching syphons in the firebox.

Chairman Coleman: Mr. Oatley, will you please come forward?

H. B. Oatley (Superheater Company): The question has been raised as to the Hungarian Railway locomotive with a purifier. I happen to have a little information on that. I do not know that it will supplement a great deal the article that appeared recently in the *Railway Age*. It is merely a large chamber (barrel-shaped) on top of the boiler, into which the water is forced from a feed water heater. In the event there is no feed water heater the water is forced there and allowed to settle. In other words, the velocity is decreased and any precipitant is allowed to settle in this purifier and be blown off. In other words it is an adjunct to a feed water heating system and a protection to the boiler. I think that purifier is little if any different from one developed in this country some years ago by two of the locomotive builders. You recall that a good many boilers of the large Mallet engines were built in what might be called two parts. Water was forced into the forward portion and from there into the main portion of the boiler. The heating of the water in that forward section where the circulation was relatively slow permitted settling of the precipitant. The water going from there to the boiler was relatively clean In other words, it localized whatever harmful action there was from the solids and, to a large extent, saved the boiler.

The other form to which I refer was where a partition tube plate, a third tube plate if you please, was located about six feet back from the forward tube plate in the boiler, the water from the injector being delivered into this forward section. A similar action took place there and the relatively clean water was allowed to pass through or over the plates into the main portion of the boiler. I believe there will be further developments of the idea.

Mr. Fuller: I move that the report be accepted, the committee continued, and the recommendations referred to letter ballot. (*The motion was carried.*)

Chairman Coleman: Next will be the report of the Committee on Resolutions.

Mr. Chambers: Mr. Chairman and members: "RESOLVED, That the officers of the Mechanical Division of the American Railway Association should be elected annually instead of every two years, in order that a greater number of members may enjoy the honor of being officers of the Division."

I might say that this resolution was offered two years ago and passed on the floor, and possibly by reason of our not being entirely out of war yet, it was not put into effect. I am offering this resolution, not without the knowledge of the chairman, but fully with his assent. There are other reasons. The duties are numerous, and for any one road to spare its head officer, which he usually is, for a continuous period of two years, to take care of this work is many times a hardship.

Chairman Coleman: I hope you will pass the resolution. There are a lot of men who are deserving of the honor of being your executive officer and in order to give the younger men an opportunity to come to the front, I would like to have you pass this resolution.

(*The resolution was adopted.*)

Mr. Chambers also presented the following resolution: WHEREAS, the Railway Supplymen's Association have this year brought to us the largest and best display of exhibits ever presented, and have carried to a successful

conclusion a splendid program of entertainment for the members of the Division, their families and friends, and enrollment has been carried out in a very satisfactory manner;

WHEREAS, the Atlantic City Hotel Men's Association has, as usual, provided for our welfare and comfort in a manner that is without criticism;

WHEREAS, we have been inspired by the action of the Executive Committee of the American Railway Association, which has done so much to spur us on to better things;

WHEREAS, The Committee in charge of the various reports have done careful and painstaking work in the preparation and presentation of their papers;

WHEREAS, the meetings have been ably planned and guided by the officers and special thanks are due to the indefatigable secretary for the manner in which he has carried out the arduous duties of his office to the entire satisfaction of the members of the Association,

BE IT RESOLVED, that the appreciation of the members of the Mechanical Division be extended to the Railway Supply Men's Association, for preparing the wonderfully educational exhibits, taking care of the enrollment and providing for our entertainment. Also to the Atlantic City Hotel Men's Association, the management of Young's Million Dollar Pier, the Executive Committee of the American Railway Association, the officers of the Mechanical Division, the members of the various committees preparing the reports, the retiring officers, the Secretary, to the mechanical press, and particularly to the *Railway Age* for the prompt reports and issuance of that periodical.

The report was signed by C. E. Chambers (Chairman), H. T. Bentley and F. W. Brazier.

Mr. Tollerton I move its adoption.

(*On motion, the resolution was adopted.*)

Chairman Coleman: We would like to call on S. O. Dunn, Editor of the *Railway Age*.

Mr. Dunn: Mr. Chairman, gentlemen, and the retiring Chairman, Mr. Tollerton. It is a great pleasure and honor to be invited to present to the retiring chairman, his Past Chairman's badge. We have been acquainted for a good many years. We have met on many different occasions, and I have had occasion to ask many favors of him in his official railway capacity, and I have never asked one yet which was not most readily granted; not only granted, but granted in a manner that made it a pleasure to accept the favor.

We have worked together in times and periods which were very trying, not only to the country, but particularly to those who were serving on or connected with certain committees. I shall not soon forget the time spent in those negotiations. I had the opportunity to observe your retiring chairman under most trying conditions, and I have no doubt I shall always find him as he has always been here—courteous, self-contained, and ready for work.

Mr. Tollerton and I have been very good friends for a long time. I know something about his career. You gentlemen also know that his career has been one of those typical American careers, which always have been and always should be a great inspiration to the youth of this country. He began his railway career as a machinist apprentice when he was a very young man. He was a fireman and a foreman. At 26 years of age he was a master mechanic, and at 42 years of age he was the mechanical superintendent of a railroad system of 8,000 miles.

A man's achievements should be judged, not merely by how he goes, but by how far he goes. No man has risen in that short period to all the ranks of the mechanical department of a great railroad system, without having those elemental qualities of energy, of courage, of fidelity to duty, and ability that are essential to a really successful career. But in addition to this he has been honored by his associates in this organization—the greatest organization of its kind in the word—by the bestowal upon him of the highest offices in its power to grant. I believe he has directed your work and presided over your deliberations for a longer period than any other man. He has been your chairman during one of the most remarkable and trying periods in the history of the railroads of the United States and I am sure that there is no one here who will question the tact, the energy, the courage, and the ability with which he has performed his duties under these trying conditions.

Now he passes into the ranks of the elder statesmen. There is an old saying, "Old men for counsel and young men for war." I think that the reference to old men here means not so much years, as it does experience. It means experienced men for counsel and young men for war, because young men have more energy and courage than old men and a want of caution which, perhaps in some cases, is a good quality. But youth always needs guidance and encouragement and I am sure as one of the elder statesmen of this association, sir, that you will in the future, as you have in the past, use your influence to help in the education of the younger men. You will encourage them to participate in the active proceedings of this organization, to do their work as you have done yours, in order that the next generation of railway officers may be equal to that of which you are a member.

It is a great pleasure and honor for me to have the opportunity to pin upon you this past president's badge which has been presented to so many of your predecessors and which is an insignia of a higher honor than many we saw when we were traveling together on the other side.

Mr. Tollerton: It is always very pleasant to hear nice things said about us. It is a great honor and I appreciate it fully, but it has also been a great pleasure to preside over this wonderful organization.

I want to wish for it all the prosperity in the world, and for each and every individual member, long life, good health and happiness. I thank you.

(*On motion the meeting then adjourned.*)

Brakes on Track Exhibit

ONE OF THE track exhibits this year is the 120-ton capacity car taken from regular service on the Virginian Railway. This car is one of a lot of 1,000 built about two years ago and is equipped with the Westinghouse "empty and load brake" which, when operated in load position, develops a braking ratio of 40 per cent of the total gross weight of the loaded car. This car has been in regular everyday service since it was built and the original brake shoes applied by the car builders are still in service after making 10,600 miles. As yet they show little wear, notwithstanding the heavy braking required under the severe traffic conditions. This small brake shoe wear is no doubt largely contributed to by the use of the clasp brake, which distributes the heavy brake shoe load. It is anticipated that the life of the brake shoes on these cars will be at least 40,000 car miles, which will contribute to a very material saving in brake shoes and in the labor of their replacement and piston travel adjustment. One of the trucks, which is of the six-wheel type, has been run out from under the car in order that it may be inspected easily.

Another device which will be of interest to air brake men is the Minich super-safety hand brake applied to one of the Philadelphia & Reading hopper bottom coal cars.

Division VI—Purchases and Stores—American Railway Ass'n

Reports on Special Subjects Covering Sinking Fund for Deterioration, Obsolescence, etc.; Office Routine; Stationery and Educating Employes

The chairman called the meeting to order at 9:30.

Report on Forest Products

W. A. Summerhays (Ill. Cent.), chairman, made a report of progress saying: The committee had three meetings during the year and engaged in general discussion of the conditions as pertaining to its work and reviewed the work of the past committees. It desires to report progress in this connection, with the addition of the following:

The committee having in mind conservation of lumber and the need of procuring and furnishing the right quality and size of Forest Products for the right use has given study to the question of specifications. The present lumber specifications in effect in the Engineering and Mechanical Divisions are not adequate and the work of revising them is underway. This will be handled by a joint committee appointed by the Board of Directors, representing the Engineering, Mechanical and Purchases and Stores Divisions.

That this work is timely is evidenced by the work recently undertaken at the invitation of the Secretary of Commerce, Mr. Hoover, by the Lumber Manufacturing & Distributing Associations. Representatives of all the leading associations of producers, wholesalers and consumers of lumber met at Washington May 22 to 25 of this year for a discussion as to the standardization and simplification of names and descriptions of grades and in the sizes of the forest products.

It is the intention to invite the manufacturers, dealers and users of forest products to co-operate in this matter. It is expected that the American Railway Association committee, above referred to, will follow the general plan as outlined; arrive at a standard of grades and sizes suitable for all kinds of lumber and all railroad purposes. The members of Division VI are urged to support this movement in the lumber trade.

(*The report of the committee was accepted and the committee was continued.*)

The Need of a Sinking Fund to Care for Losses Incidental to the Handling, Use and Distribution of Materials

By H. H. Laughton

Assistant to Vice-President (Operation) Southern Railway.

FOR MANY YEARS it has been known by most experienced and practical supply officers that there should be some definite, systematic and approved plan provided for currently disposing of losses that are incidental to the handling of materials and supplies such as, shortages, deterioration, obsolescence, variation in prices, etc. It is fully recognized and thoroughly understood that shortages are inevitable, if inventories are correctly and honestly taken, for the following reasons:

1. All material received on a railroad must be charged, either directly to stock or to some other specific account.

2. A certain percentage of material becomes obsolete each year, due to various causes, the chief of which are changes in equipment or designs, discontinuance or restriction in the use of certain classes of equipment and appliances.

3. A proportion of all material carried as stock deteriorates annually due to a considerable quantity, particularly lumber, cast-

ings, etc., being carried in the open and exposed to climatic conditions.

4. When material is used and not reported by the using departments it necessarily creates a shortage.

5. Failure periodically to revise the price book to actual price conditions.

We believe the above few, (but not by any means all) examples are convincing of the necessity for the creation of a fund or suspense account to take care of the depreciation and losses in assets as reflected by materials and supplies, and to dispose of such losses currently. The plan we offer is to first establish a fixed percentage at which all second hand usable material, with such exceptions as are always necessary to properly make effective any plan, shall be taken into the assets of the company at a fixed percentage of the current market price, which percentage should produce a low minimum value for all such second hand material.

When such material is issued, it should be charged out at current market prices applicable. The difference between the second hand price, as agreed, and the new price applied, will provide a credit balance for such a fund to be known as "Suspense-Inventory Adjustment." Against this fund should be charged as developed:

1. The difference between the value of material as represented by the book or ledger value, either for sale or salvage.

2. The difference between the book value of any item and its value for actual use by the railroad.

3. All shortages due to material having been issued and not reported.

Each one of these items should be separately investigated from time to time and all of the actual facts developed.

After approval by the proper authority, the fund should be charged by the chief accounting officer (who should have control of the account) and the stock account duly credited, with all such shortages or differences.

This method will permit the comptroller to close and distribute periodically these balances whenever desired, instead of making adjustments through operating expenses at various inventory periods.

The entire plan has for its purpose the establishment of a means by which the supply officer can handle his business in a systematic business-like way, with the knowledge that his purpose is to, as accurately as he can, provide, distribute and account for all materials, with the means of honestly, openly and clearly setting forth all losses incidental to the proper conduct of the business.

Discussion

The Chairman: Is it your idea, Mr. Pearce, that you should have an account against which you should write off depreciation?

Mr. Pearce: Yes.

The Chairman: In other words, instead of having the inventory adjusted or charged direct to primary account you want the Obsolescence Account to take care of that offered by the management.

Mr. Pearce: Every item adjusted on its merits.

The Chairman: You will support that?

Mr. Pearce: Precisely. I move that the recommendation be accepted and a committee appointed to further examine and develop it.

(*The motion was seconded and carried.*)

Office Organization in Purchasing and Stores Departments

By E. W. Thornley

Assistant Purchasing Agent, Baltimore & Ohio.

The activities of the purchasing and stores Departments involve a great amount of clerical work which is burdensome unless thoroughly systematized. In his paper Mr. Thornley has considered the importance of the subdivision of the office organization of these departments into bureaus, each covering one of the major sections of the work.

The greater part of the paper deals with the purchasing department. The organization is outlined in a concise and logical manner and the duties of each of the bureaus are defined. While the plan outlined may not be applicable under all circumstances, it is sufficiently flexible to meet the requirements of the store and purchasing department officers of the larger railroads and the same general scheme should give good results on any road whether large or small.

THE STORES DEPARTMENT should be in charge of a general storekeeper who should be responsible for the custody, care and distribution of all materials not actually in use, as well as for the quantities of materials on hand, including scrap and second-hand material.

The office organization of the general storekeeper must depend entirely upon the practices pursued by the individual roads. On some of the smaller roads practically all of the accounting for materials is handled in the office of the general storekeeper. On the larger roads the practice generally in effect is to have the accounting handled by division or district stores. For this reason the office organization of a small road sometimes exceeds the organization on a much larger road. The general storekeeper's office organization on a trunk line system, which has worked out satisfactorily for a number of years, is divided as follows: Accounting Bureau, Requisition Bureau, Scrap Sales Bureau, Mailing Bureau and Filing Bureau.

The employees of these bureaus all report to the chief clerk. The chief clerk handles the ordinary run of correspondence of the more important subjects while the assistant chief clerk handles routine correspondence and the following defined subjects: The return of and credit for empty containers. Material for repairs to cars on foreign lines. Miscellaneous orders for material from outside concerns—excluding scrap.

It has been found desirable to maintain a complete record of all oil drums, cement sacks, gas and oxygen cylinders and containers of like character belonging to shippers; this to insure their prompt return, thereby avoiding rental charges and charges for losses owing to inability to return. Such a record will, if installed on any road handling a very large number of empty containers, result in a considerable saving.

Accounting Bureau

This bureau prepares cost data sheets, statements showing the cost of handling, audits pay rolls of the division store, prepares the consolidated stock balance sheet and answers inquiries pertaining to accounting matters. The preparation of the consolidated stock balance sheet in the office of the general storekeeper insures a prompt handling and keeps the general storekeeper in touch with all current stock balances. While the consolidated stock

book may enable the general storekeeper to determine the units of the various classes of materials on hand, he is also responsible for the money investment, and should, therefore, be equally well posted on this feature.

The practice in connection with the methods above referred to is followed on a road where the charges to primary accounts are handled on the division and the work of the accounting bureau in question deals with the accounting for physical units.

Requisition Bureau

This bureau handles all requisitions, makes transfers of surplus stocks, verifies blue prints and specification references, maintains a blue print and specification file and handles the standard stock book. All changes in blue prints or specifications are reported to the general storekeeper promptly: this enables the requisition bureau to issue corrections to the division storekeeper, thereby avoiding the possibility of purchasing materials about to become obsolete. All instructions issued by other departments affecting the distribution of material or changes in designs or blue prints, are referred to the general storekeeper for his comments and approval and when the instructions are issued they are issued as joint mechanical or maintenance of way and stores department circulars of instructions. On some roads all surplus is transferred from a consolidated stock book while other roads use a regular form provided for reporting surplus material. Either form may be handled successfully, local conditions must necessarily govern.

One advantageous practice that has been pursued for a number of years is to have the storekeeper forward to the general storekeeper a copy of every requisition prepared. In many instances it is found material is required before the original requisition reaches the general storekeeper and, owing to the fact that a copy is on file in his office, orders may be placed in advance of the receipt of the original requisition without fear of duplication or the placing of orders for improper material. Another purpose to which this copy of the requisition has been put is to make all changes necessary in connection with cancellations, reductions, transfers, changes in blue prints or specification reference on the duplicate as well as the original copy. When the original requisition is forwarded to the purchasing department or to the general storehouse from which the material is to be transferred, the copy is returned to the originating storekeeper so that his records may be changed to agree with the original requisition. This system, if pursued, will eliminate much correspondence. Another time saving feature is to take a record of all requisitions. By referring to this record, the general storekeeper is enabled at all times to locate any requisition from any station on the road.

Scrap Sales Bureau

The practice of having shipping orders, sales bills and correspondence pertaining to the sales of scrap handled by one desk has been found advantageous. As all correspondence regarding shortages in weights, improper grading, changes in shipping instructions, etc., usually reach the general storekeeper he must maintain a record of such shipments, and special card index forms have been provided for that purpose. These forms show all information as to dates of shipments, weights, etc., and claims allowed or refused, thereby insuring against duplication of claims. The general storekeeper can at any time by examination of the open cars determine the amount of scrap unshipped on sales certificates and takes the necessary action to close out. The closed cars are filed in numerical order and provide a ready reference for his information. Copies of all sales bills are kept on file in the office of the general storekeeper, thereby avoiding much unnecessary correspondence in connection with the collection, etc., on materials shipped to outside concerns and individuals.

Mailing Bureau

The mailing bureau takes care of all incoming and outgoing mail, telegrams and requisitions to be forwarded to various parties for whom intended.

Filing Bureau

The filing bureau takes care of all filing of correspondence, as well as statements.

Purchasing Department

The purchasing department should be in charge of a general purchasing agent or purchasing agent who should buy all materials and supplies of every description required for use by the railroad, including new equipment, and should sell all scrap, obsolete and surplus materials, including retired equipment. That officer may be assisted by a buying corps, generally referred to as assistant purchasing agent, lumber agent, stationery agent, etc., to whom the purchase of certain material subjects are assigned. The general purchasing agent, or purchasing agent, desides upon the buying policies, and has general supervision over the work of the organization; individual buyers purchasing certain classes of materials as selected by him, the subjects assigned to each being, as far as practical, according to stores department material classification accounts.

Office Organization of the Purchasing Department

The purchasing department office organization may be divided into bureaus, under the supervision of chief clerk, the bureaus being designated as follows: Order Bureau, Price Record Bureau, Voucher Bureau, Correspondent Bureau, Statistical Bureau, Filing Bureau, Miscellaneous Sales Bureau, Mailing Bureau and Freight Sales Agency.

The detail of the organization should, of course, be regulated to meet the requirements of individual railroads, but one as outlined above has proven particularly efficient on a trunk line system.

Receipt of Requisition

The routine of the office begins with the receipt of a properly approved requisition transmitted through the office of the general storekeeper. To facilitate the handling in both the stores and purchasing departments, individual requisitions are so prepared as to contain only such items of material as are properly grouped under one material classification account. Requisitions of each classification account are originated on specified dates, so that all such requisitions for one kind of material are received in the office of the general storekeeper on approximatley the same day. In this way, the requisitions may all be checked at the same time with the master stock books or surplus reports and, after transferring any material available in stock, they are then forwarded to the purchasing department. By so handling, requisitions from all stations, for the requirements of one class of material reach the purchasing department at the same time, so that negotiations may be opened for the purchase of a month's supply or more of material in a given class, thereby minimizing the work of this department and making it possible to take advantage of quantity purchases, etc. Upon receipt of the requisitions in the purchasing department, and after record has been taken of their numbers, date of receipt, etc., in a form provided for that purpose, they are distributed to the respective buyers, who, in turn, indicate in the column provided, the name of the firm on whom the order is to be drawn, terms of purchase, etc., for such items that price arrangements permit, marking the remain of items "B" (for blank) and then forward to the order bureau where orders are prepared. The order numbers are marked on the requisitions, which are then filed in station and numerical order in a loose leaf binder, and thereby become an index to the orders.

Preparation of Purchase Orders

After the requisitions are properly disposed of, the next form handled is that of "purchase orders." Orders are prepared in quintuplicate for distribution at the proper time, as follows:

1—The original to the seller.

2—The duplicate for the information of the engineer of tests. This is used by him in arranging the work of his department in following up the tests which are to be made at point of manufacture or destination, as the case may be.

3—The triplicate for the division storekeeper originating the requisition. This is used by him in the hurrying of material, that is, where the order has been placed. In urging delivery, reference is made to the order number as well as the requisition number. The storekeeper is not permitted to hurry material direct on the shipper.

4—The quadruplicate for the purchasing department's statistical bureau. This is used for compiling information as to the value of materials ordered for the information of the general purchasing agent or purchasing agent.

5—The quintuplicate for the purchasing department's price record bureau.

The orders, after proper preparation, are distributed to the respective buyers. Orders which are complete in all details are checked as to accuracy, and, after being approved by the general

purchasing agent or purchasing agent, are dated by the means of a rubber dater, and distributed as previously outlined. Inquiries are then gotten out on the orders which have been prepared in blank covering material on which no price agreement is effective and which is to be purchased on competitive bids. The order is then placed with the inquiry in the open file until the closing date, when the quotations are tabulated and at which time the order is completed by entry of name of firm with whom the business is to be placed, on what terms, etc., and then released through the regular routine. The quintuplicate, or office copy of the order, is placed numerically in a loose leaf binder as an open file, and, as invoices are received shipments are recorded thereon. After all of the material, appearing on the individual order, has been shipped, it is removed from the "open file" and placed in another loose leaf book, commonly referred to as the "completed file," where it is retained until one thousand orders are accumulated in successive numerical order at which time they are removed and are bound as a permanent record.

Price Bureau

Closely connected with orders, in fact, a direct outcome thereof, are the duties assigned to those employed in the price bureau. The work in this department is sub-divided along material classification lines, i. e., the individual price clerk handles only certain accounts, and thereby becomes more or less of a specialist in the class assigned to him. The duties incumbent upon positions in this bureau, are:

1—Tabulation of the quotations received in response to inquiries.

2—Posting of invoices received on the quintuplicate copy of the original purchase order, showing the date of shipments and quantities forwarded. This permits of knowledge at all times of the status of orders placed.

3—Checking of invoices for correctness of price, terms of purchase, etc., and the recording of them in what are termed the price books. The price books are loose leaf ledgers in which are two distinctive styles of sheets. The one form is used for recording accepted prices taken from contracts and tabulations from which awards have been made. On the other form an entry is made of the material bought showing date of order; date of invoice; quantity of material covered by the invoice; unit price; total amount of invoice, etc. These books are arranged in alphabetical order, and permit of records being taken of separate items or groups of materials purchased. For example if space were provided for boiler tubes, the first sheet of this subject would be for prices, following which would be pages necessary for entering a complete record of shipments of boiler tubes.

4—Where incorrect information is given on the invoice by the shipper, such as to the price, terms, etc., they are returned to him by the price clerk for correction. This is handled through the means of a printed form of circular letter in order to expedite the handling. A record of this transaction is kept to insure that discounts or delayed payments brought about by these errors on the part of the firm, are not charged against the railroad.

Voucher Bureau

The voucher bureau next handles the purchase invoice after same has passed from the price bureau into the voucher bureau, it is recorded in the "voucher ledger" according to firm's name, and is then listed to the division storekeeper for approval as to the receipt of materials, etc. The original purchase invoice, in most cases, can be handled promptly upon receipt in the office of the division storekeeper, due to the fact that the shipper forwards a duplicate copy thereof to him on the date that the original is mailed to the purchasing department, and this permits the division storekeeper to have all verifications ready on his duplicate copy for comparison with the original when received. After the division storekeeper makes proper certification on the face of the original invoice as to the receipt of the materials, and supports same with freight bills, and, where necessary with copies of Inspection reports of the test bureau, he re-lists same to the purchasing department and transmits them thru the office of the general storekeeper. Upon their arrival in the voucher bureau, they are again checked with the ledger as to their return, and are then filed in alphabetical and firm order. At regular intervals throughout the month vouchers are prepared in duplicate to cover their payment. Invoices carrying cash discounts are, of course, vouchered in time to avail of the discount, while those not carrying discounts, are vouchered at stated intervals throughout the month. All vouchers are transmitted to the treasurer through the office of the auditor. Another duty assigned to the voucher bureau is that of handling all correspondence pertaining to accounts, such as, delayed payments; verifications of the correctness of the monthly statements submitted by the shippers, etc.

Correspondence Bureau

The work assigned to this bureau consists of:

1—Hurry delivery of materials.

2—Following up orders for shipments that are not made within the specified time agreed to when orders are placed.

3—Tracing shipments delayed enroute.

4—Supplying additional information on orders placed.

5 Furnishing blue prints, specifications, etc.

The greater portion or the time of the employees in this bureau is devoted to the hurrying of shipments and following up of the orders on which shipments are delinquient. The subjects assigned are according to the store department material classification, and, generally speaking, are in the same order as are handled by the individual buyers, that is, each individual buyer is supported with a correspondence clerk, this being done to insure greater efficiency. Where there is any marked trouble or delay experienced in the making of shipments, or, where a concern is generally slow in making deliveries, the information is transmitted to the respective buyers which enables them to take necessary action to insure that the terms of purchase are complied with, and, as a guidance in the award of future business.

Statistical Bureau

All office statistics are compiled in this bureau. They consist of:

1—Preparation of information as to the quantities of the more important items purchased, together with the total and unit cost thereof.

2—Preparation of reports for the Interstate Commerce Commission and other governmental bodies.

3—Recording of time of the employees in the department and the preparation of pay-rolls.

4—Following up of contracts to insure that all provisions thereof are met.

Filing Bureau

The work assigned to this bureau is similar to that found in all well regulated offices, and, generally speaking, consists of the proper filing of correspondence, reports, etc., in which the "cross index" system is used.

Miscellaneous Sales Bureau

This bureau handles all matters pertaining to the disposition of scrap, obsolete and surplus materials. In it is handled the preparation of the form soliciting bids; the tabulation of offers received, the preparation of sales certificates and the proper recording of all transactions from that date.

Mailing Bureau

The duties of the employees of this bureau are selfexplanatory. They receive all incoming mail, as well as telegrams, mailgrams, etc., and distribute same to the proper recipients. It is also their duty to look after the forwarding of all outgoing mail, orders, etc.

It is to the representatives of this bureau that commercial salesmen, etc., present themselves when desirous of interviewing the general purchasing agent or purchasing agent, as well as the members of his buying staff, and it is felt that these employees can go a long way towards creating a friendly feeling between buyers and sellers. It is commonly known that, where friendly relations exist between the railroad buyers and members of commercial houses, the former are given the advantage of special opportunities whenever the commercial representatives have them to offer. If the reception clerk can greet a visitor by name it tends to create a friendly feeling and it is thought that such employees should be impressed with the desirability of remembering faces to the greatest possible extent in order that they may so greet representatives who, in turn, generally live up to the cordial greeting.

Freight Sales Agency

A freight sales agency, in charge of a freight sales agent, under the supervision of the general purchasing agent, has been found to be the best means of disposing of all over, damaged and refused

freight shipments, except perishable freight. This material is disposed of, in the majority of cases, through competitive bidding. The old practice of accumulating freight at warehouses at various points on the railroad, and selling at public auction at stated intervals throughout the year, is not nearly so satisfactory as concentrating the freight and selling it through the medium of an agency. The principal advantages obtained are three-fold. They are:

1—Better accounting for refused and unclaimed freight.

2—Greater returns are received due to the higher prices obtained.

3—Increased efficiency in handling to prevent further damage and deterioration.

When the shipments are received at the freight sales agency, each individual item is numbered and a record taken in a loose leaf book, giving a general description of the commodity and its condition, way-bill reference, forwarding station, and where possible, the name of the consignor and consignee, and the town or city from which originally shipped. A copy of this report is forwarded to the general freight claim agent for his information and record, and, in a great many instances he is enabled to reconcile claims and have shipments returned to the owner, and cancel the claim. The shipments, when received, are unpacked, put in presentable shelves to permit of a ready examination. This arrangement is carried out along lines similar to the sectional arrangements at our storehouses, in that certain places are assigned for handling freight of particular classes. When over-shipments are received, and especially when the freight is in good condition, such as household goods, etc., for which a large number of claims are usually filed, the same are withheld from sale until every effort is exhausted by the general freight claim agent to locate the owner. A card index file is kept showing the names and addresses of purchasers of various commodities, and when shipments are ready to be sold, a notice is sent them showing the sales number and description of the items, inviting inspection and their best offer. When bids have been received, they are tabulated and award made to the highest bidder. By this method of handling, the possibility of forming pools for buying at ridiculously low prices, as is often done at public auction sales, can be reduced to a minimum.

Discussion

W. F. Jones (N. Y. C.): In numbering requisitions, we supplement the Purchasing Agent's numbers with classification numbers. In other words, when ordering material under classification 45, the number of the requisition would be "6-45-1," "6" being the Purchasing Agent's number; "45" the classification number; and "1" the page number. All invoices are filed in my office according to classification number; and when the requisitions are finally filed in the purchasing agent's department they are filed according to classification number. Then when the purchasing agent calls for them, to get up statistics in regard to any particular item, he has the requisitions all together under that classification. In regard to "Separation of Purchase Orders," Item No. 3, those are delivered every two or three days, or every week. The purchasing repartment has prepared blanks which are signed by the purchasing agent. Every division storekeeper has a supply of these blanks and when he gets material he traces it directly on the number which he gave to the order and senrs a copy to the purchasing agent. The reply goes direct to the purchasing agent, and when he makes any comments he sends copies to the general storekeeper.

Vice-President Reed: Is the organization based on the governmental organization at Washington?

E. W. Thornley (B. & O.): No; the form, or 90 per cent of it, is being used on the Baltimore and Ohio today.

Vice-Chairman Reed: About two years ago we made an investigation on the Rock Island with reference to the heavy losses incident to the leakage of paint, which is shipped in wooden barrels. We found the amount to be between $15,000 and $18,000 per year. The Rock Island runs from Oklahoma and Texas to Minneapolis and St. Paul. We found that while we would not lose much paint in Minnesota, considerable quantities would be lost in Texas. At the suggestion of the paint manufacturers, we adopted the "one-time" shipping container. This is a steel drum, made of light gage sheets, costs about $3.00 or $3.50, and does not break open when handled. The head of the drum is about 12 or 14 in. in diameter and is put on with set screws and a gasket, which can be taken off. After the paint is taken out the drum can be used as a water barrel or fire barrel and for the shipment of crude oil, fuel oil, and items of that kind on the railroad.

H. H. Laughton (Southern): Is this loss and damage taken into the stock account?

E. W. Thornley (B. & O.): No. The records are turned over to the general freight claim agent; we act as his agent.

The Chairman: Approximately how many clerks would be required in the purchasing office of a large road to handle an organization the size you outlined?

Mr. Thornley: I think we have approximately 37 clerks in our organization. That includes purchasing organization, lumber agent's office, and freight sales agent.

J. C. Kirk (C. R. I. & P.): Some of our paint comes in five gallon cans which have a pressed lid. We are able to reclaim these cans and make dope pails out of them.

A. A. Goodchild (C. P.): We make all shipments in five-gallon oil cans.

Possible Economies in the Stationery Store

By B. C. Tobey

General Storekeeper, Lehigh Valley.

THE WHOLE PRODUCT of the stores department is economy. It can produce nothing else. It is absolutely essential that we all, both individually and collectively, show that we are interested in this question.

It is generally conceded that stationery should be handled as a part of the general stores organization and be placed under the direct jurisdiction of the general storekeeper, and that handling of stationery as a separate stock, with a stationery storekeeper in charge, should be done at general storehouses wherever they are centrally or conveniently located, as when so arranged there is a complete organization on the ground for ordering, receiving, storing, distributing and accounting for material and supplies that can be utilized to the best advantage from day to day, as the work demands, at a minimum of expense.

All railroads should have a stationery committee and have as its chairman a direct representative of the chief executive officer, the balance of the committee to include the stationery storekeeper and representatives of using departments.

The first and most important thing to do, is to adopt "standards"—whether it be pencils, ink, pens, books or blanks—and one of the most important of these is quality of paper to be used. Impress upon all concerned that paper "grows" in standard sizes only and that all reports, blanks and books should be made of a size to cut without waste from these sizes. This committee should designate the kinds and quality of all standard stationery, office supplies and mechanical appliances. No changes in existing forms or no new forms should be introduced without the approval of this committee. Standardization of forms permits ordering in quantity with the consequent reductions in costs.

In ordering a new form, the paper, weight and quality ought

always to be considered. Unless a form is of an important character requiring a high grade of paper, cheap white chemical manila stock should be used, and it will be found that light weight stock serves in most cases. Colored paper should never be used unless absolutely required for some specific purpose, it being more expensive and difficult to get.

Whenever possible to do so, forms should be printed on the back of printed forms which have become obsolete. Black ink should be used, as it is the cheapest kind obtained.

Probably the largest saving to be made in the operation of a stationery store is by printing a large portion of the small and simple forms locally. It will be found that fully 80 per cent of the forms used on a railroad can be printed "at home" at a saving. I do not consider that it would be economical to operate a complete equipped printing plant, or one that would be of sufficient capacity to print all the forms used, for usually a certain class of work is required, which can only be accomplished by the highest grade of skilled printers and machines. In operating a printing plant the main object is to have such facilities and labor as to keep it busy continually and let the overflow go out.

It is estimated by most roads that they are saving anywhere from 20 per cent to 50 per cent over printers' costs by doing this work themselves. The printing organization, whether it consists of one or a half dozen machines, should be given the same opportunity to bid on work to be done as commercial printers and no partiality should be shown. It will be found that there is plenty of work that can be handled by your own printing establishment at a saving to keep it running all of the time. You can also better control and keep your stationery stock balance at a minimum and give better service when printing a part of your own forms.

Multigraph equipment is being used by most of the roads and it is my personal opinion that there is room for from one to four or five such machines on every road where it is not found desirable to install complete printing plants. It can be purchased complete for about $1,000. It has a normal capacity of 4,800 impressions per hour, size 8½ in. by 14 in. and under, and can be operated by compartively cheap help, while a job press of a similar size would cost about $3,000, having a normal capacity of but 2,400 impressions per hour and requiring skilled pressmen or compositors at union labor rates. Beyond runs of 100,000 it will undoubtedly be cheaper to give the work to a printer.

Every up-to-date stationery store should have a power paper cutter and a padding machine so as to be able to cut up all the obsolete forms and other blanks for figuring tabs and second sheets. There is a large amount of plain paper used on a railroad and if you buy it cut the printer will charge at least one-half cent per pound and possibly more for the cutting. With your own cutter you can cut it for one-quarter of that. This paper cutter can also be used in cutting carbon paper, cardboard, blotters, oilboards, mimeograph cloths, etc.

A few roads also make a practice of furnishing plates to printers, but do not believe there is much money saved in following this plan, as the printing market is always highly competitive and regular printers figure to distribute the cost of the plates over a period of a year or more. We are always, therefore, assured of the best prices on account of the competitive feature involved.

On one or two large systems "Duplicating Bureaus" have been established which have been very successful. The idea is to have all of the duplicating machines in the various offices placed in one office and the work consolidated. It was found that machines released were of all sizes and makes and a large number could be disposed of by sale or turned in for new up-to-date machines so that the initial cost was but very little. It would be difficult to determine the amount of labor saved since part time work was employed in all of the different offices in doing duplicating work and the operators doing this part time work expended a great deal more time than was necessary, due to the fact that they would always have to make ready the machine for a little run and then box it up and set aside when the little job was completed.

I have also found that some ten railroads are maintaining their own typewriter repairmen or shops and are apparently saving considerable money. The equipment necessary, consists of but a work bench or revolving table on which the typewriters are placed so they can be worked on from all sides to good advantage, an electric buffing machine, a two part laundry tray—one part for sodium cyanide solution or benzine for cleaning the machines and parts and the other part for washing—some shelving and drawers for machines and parts, and a kit of tools, all of which will cost not much over one hundred dollars. The full kit of tools should be bought from the typewriter company, as they have the best tools adapted for that purpose. Most roads figure that they are saving from 20 per cent to 35 per cent over the cost of having this work done by typewriter companies. In addition, machines are kept in much better condition than when the work was done outside.

One railroad company reports that during the year 1920, as many as 8,095 typewriters were overhauled, repaired or inspected at an average cost of $6.99 for overhauling, $2.60 for light repairs and $1.31 for adjusting and inspecting. Another road reports they repaired 456 machines at an average cost of $9.53 as compared with $15 per machine formerly repaired by the dealers or a saving of $5.47 per machine repaired, a total of $2,494.32. Still another company reports that during the year 1921, with one repairman, who is paid $150 per month and an outfit costing $184, they repaired and adjusted 1,244 typewriters at an average cost of $2.10 each, or a saving of $1,702.04 over the estimated cost of having the work done outside.

One road reports that it is making its own typewriter ribbons at a cost of less than half what good ribbons can be bought for. It is not economy to buy poor ribbons at any price. The equipment costs about $150. The tape, best English imported, costs about $2 per roll of approximately 150 yards and the ink costs $2.50 per tube for record ink and $3 per tube for black copying blue.

You can make ribbons light inked, medium light, medium heavy and heavy. The spools and boxes can be used over and over again, thus saving the purchase of any new spools or boxes.

Where the consumption of typewriter oil warrants the ordering of large quantities it will be found that quite a saving can be made by purchasing it in five gallon lots and bottling at the stationery store instead of sending out in can containers. Bottles used in shipping are Edison Battery Oil Bottles.

A majority of the roads canvassed report that they are using ink tablets or powders instead of fluid ink and thus saving anywhere from 40 per cent to 80 per cent on their ink bills. This ink is equal to fluid ink and is just as permanent. It overcomes the bad feature of shipping ink in bottles to the different offices on the road by train service, where they are frequently broken and quite likely to cause damage suits by spoiling baggage.

One road reports that they are saving $450 per year by making their own supply of mucilage. The mucilage is made of Gum Arabic and Benzoate of Soda. The Gum Arabic is purchased in twenty-five pound lots together with one pound of Benzoate of Soda. The Gum Arabic is powdered at the Storehouse and Benzoate of Soda mixed with it and sent out in envelopes. One of these envelopes costs about seven cents and makes a quart of mucilage.

Another road reports that for the past year or two they have been maintaining a stock of carbon paper which they have been aging, that is, drying it out somewhat so that it will not be green when shipped out for use. They found that in nearly all cases companies that furnish this commodity ship it green and if used in that condition it is practically impossible to obtain maximum service.

One Stationery Storekeeper reports that on his road stamp pads are manufactured at an annual saving of $172. On the same road mimeograph cloths are manufactured at an annual saving of $70.

Stencil paper liquid moistener is also manufactured at a saving of $153 per year.

Binders received at the stationery store with old scrap paper to be sold, reused or destroyed should be salvaged. One road reports saving $3,852 on this one item in 1921.

Where stationery is not delivered by supply train or car it will pay to ship in specially constructed cases of two sizes, the larger case measuring about 30 in. by 48 in. by 24 in., and the smaller case just onee-half as long.

Some of the possible economies mentioned represent but little money, but, in the aggregate they amount to considerable and they have a tendency to keep everyone on the alert or lookout for waste and it is surprising how much moral effect it has on the employes.

(The report was accepted.)

Educating Employees of the Stores Department

By A. S. McKelligon

General Storekeeper, Southern Pacific.

It is often stated that an executive or administrative officer need know little about the details of the business. This does not apply to the stores department. Officers or department heads should be selected from men who have gone through the mill and obtained their experience first hand, and who have shown zealousness, loyalty and proficiency. The absence of this practice has been the cause of unnecessary investments in materials and enormous losses in obsolescence.

It was once considered in some quarters, and happily that day is now past, that anyone could be a storekeeper or run the stores; that it did not take any particular talent or experience.

Our help usually comes to us through recommendations of employees already in the service or from sons or daughters of employees at present in the service. Such young men and women after having the necessary school education are the best of raw material. Unfortunately in the past too many boys have wanted to immediately tackle white collar jobs; it is well and important that they have office experience, but the actual handling of the material should come first. They should start as laborers, truckers, helpers or in the stores delivery. It is important that we show interest in the work of those in the organization; we should make repeated inspections and make this in every detail. Those whom we are training soon learn whether or not the one in charge passes over certain things; it is simply a matter of continual supervision, and if supervision lets down slackness creeps in.

These employees on entering the service, no matter what the job may be, how small, should be given a general talk by the foreman in charge, or by the storekeeper, and impress upon him the importance of the work that is being carried on; the value of material stored within the storehouse and that which he comes in contact with, and in which he has a certain responsibility.

An important thing to impress upon them is to stick to the job if they once make a start. The prime essential is that one must like his work. If he does not, it is best that he choose some other line before he has gone too far. No man can hope to succeed if he takes just a passing interest in his work. Arouse their enthusiasm and once you get this aroused, never let it flag. This is done by paying proper interest to the employee's work. When you have promotions make them from your own organization; beware of importations; it is the quickest way to play hob with your organization. In saying this, it is assumed, that you have a trained man at hand. One must always know and feel that he is preparing himself for something better. Success cannot be developed in any man who has only a blank wall to look forward to; he must see an avenue of opportunity open ahead. It is the clear open road that leads to success—the blocked pathway to discouragement. Consider merit and efficiency, together, of course, with loyalty. Arouse this by frequent meetings, local as well as general; encourage suggestions; dictatorial arbitrary methods fail to bring out the best in the men. Encouragement and a friendly pat on the back will do more for most boys than a lecture, and above all, beware of the condition of waiting for some one to die. In touching on this, will quote in part from an editorial on this subject in the *Railway Age* dated May 13, 1922, entitled "Waiting for Someone to Die."

"The expression 'Waiting for Someone to Die' is not a particularly pleasant one, yet it is often heard among railway men in reference to the possibilities of promotion. It is not, however, with the advancement of individuals that this expression has been most strongly impressed upon us, but rather with the advancement of railroading itself. Now and then there are railway officers who, because of their beliefs, prejudices, misinformation, personal animosities and other reasons, are blocking the adoption of something of proved benefit."

To adapt this principle to our business we must be ready to adopt modern storekeeping methods as advocated by this section. Go back home from the conventions and really put some of the recommended practices to work, and while educating our employees be ready to learn yourself. We must visit the other fellow and see what he is doing, and just because it is someone else's idea or because it does not conform to the methods in vogue on our railroad, or of some old practice in effect for years, do not condemn the plan; give it your concern, and if you do adopt it when the occasion arises and in fairness to your neighbor's railroad, give the credit where it is due.

The initiative of the employee should be allowed to roam. Take the check rein off, but hold them up to the bit; train them to be thorough; there is no more satisfaction than having a man who is thorough. Employees should know the why and wherefore of instructions, or why a certain thing is done. You will have the aid of those down the line in carrying out an order that is intelligent to them and they know the reason therefore. It is well in the education of our employees and ourselves to compile analytical statements for comparison purposes. Make them compete, or at least get in step with the other fellow. Fair and honest team competition means progress. I have said "team" competition as individual competition breaks up the team and disrupts the family.

Fair and just treatment must be accorded to all, but our pupils must be made to understand that just treatment and fairness is due the company and department. There is a happy medium between the strict martinet style and the indulgent one. They must be taught and it must be reiterated that the various departments are organized only to carry on efficiently the different work assigned to them so that the railroad as a whole will function with the least friction—department lines must be broken down at any time and anywhere for the good of the railroad. There is only one ultimate object for which we are striving—to produce the best transportation and service at the least cost. If you train men along these lines, when stress comes to your department or railroad, when you as one unit must surmount some obstacle, you will be surrounded by a band of loyal co-workers who will fight with you and for you in such perplexities and hardship. When you must drive to get as nearly as possible something out of nothing, you will have a team and team work which will bring this as nearly to an accomplishment as possible so to do.

Fuel Conservation Joint Committee

The Joint Committee on Fuel Conservation, consisting of seven representatives each from the Operating, Mechanical and Purchases and Stores Divisions, held its first meeting at New York City, January 6, 1921.

Wm. Schlafge, mechanical manager, Erie Railroad, was elected chairman. The representatives of the three Divisions constituting the Joint Committee elected Vice-Chairmen as follows: Operating Division, W. M. Jeffers, General Manager, Union Pacific; Mechanical Division, Wm. Schlafge, Mechanical Manager, Erie; Purchases and Stores Division, Saml. Porcher, General Purchasing Agent, Pennsylvania System.

Under the plan of organization as adopted for the Joint Committee, the Chairman and Vice-Chairman constitute a Committee of Direction. The office of the Secretary of the Mechanical Division, at Chicago, was designated as official headquarters of the Joint Committee.

The Joint Committee decided for the present to confine its activities to the following subjects:

1. Organization for Fuel Conservation, having in mind cooperation of various departments and employes. 2. Inspection of Fuel at source of supply and preparation of a fuel schedule or specification. 3. Statistics. 4. Methods of Conservation—Mechanical and Otherwise.

Meetings of the Committee were held January 6, 1921; March 29 to 30, 1921; September 7, 1921.

Discussion

The above report was read by Samuel Porcher (General Storekeeper, Penna.), chairman of the committee, who also added the following comments: Some explanation is necessary. Fuel is a very important item of railroad expense, perhaps 30 or 35 per cent. In addition to the A. R. A. many other associations give the question of fuel consumption a great deal of attention. The American Society for Testing Materials and the Association of International Railway Fuel Associations have been concerned with this subject for a number of years. From the standpoint of Purchases and Stores, and in my connection with this Joint Committee of the A. R. A., I have done what I could to bring forward the conservation of fuel. I presented to the Joint Committee at one time, in March, 1921, what I call some aspects of the Purchase of Fuel which relates closely to, or determine altogether, its conservation. They are as follows:

1. There should be a clear statement of the kinds and grades and the qualities of coal or oil to be purchased so as to insure the acquisition and receipt of fuel which is best suited for the purpose.
2. There should be a definition of the standard of quality—specifications—B. t. u., ash, preparation, size, inspection, and for oil, the gravity, etc.
3. There should be careful selection of the sources of supply. The mines or wells should be examined by competent persons to determine whether their product, the coal itself or its preparation, or the oil will be delivered in conformity with the standard of quality.
4. The product of a designated mine or oil field should be purchased rather than a commercial or pool grade.
5. There should be the stocking or storing of a certain part of the annual requirements when prices are favorable and delivery abundant or easy, and the use of that stored fuel when conditions are reversed.
6. If the coal supply is derived from mines on the line of the road and is used at many different points and if a large supply is not carried in storage at a few points, orders should be placed with the producers so that distribution can be done with the shortest haul and the most easily maintained communication.
7. An ample supply of cars should be furnished.
8. The management of purchases should be put in hands of a capable purchasing agent or fuel agent with a competent organization.
9. There should be co-ordination of that buying organization and the operating, traffic and transportation branches.
10. Conservation is understood to relate to the kinds of fuel and their proper and most economical use rather than to the price at which fuel may be had; the lowest priced fuel per ton or barrel for oil might not bring the best return per dollar expended, and therefore, in this analysis prices are not taken into consideration beyond the making them a factor in the determination of the problem commensurate with the other factors consequent upon them.

(*It was moved and seconded that the report of the committee be accepted as read and that Mr. Porcher be continued as representative of Division VI on the Joint Committee.*)

Report of Memorial Committee

It is with deep regret we have to anounce the death of the following members of this association since our last meeting:

J. H. Collins, Southern Pacific Co., Los Angeles, Cal.
Chas. F. Jennings, Bingham & Garfield, San Francisco, Cal.
O. C. Wakefield, Northern Pacific, St. Paul, Minn.
F. J. Angier, Baltimore & Ohio, Balt., Md.

Realizing the loss to the Association and to the families and friends, *Be it resolved* that we, the members of the American Railway Association, Division VI, Purchases and Stores, express our sympathy with the families of each member and their friends:

And further resolved, that this resolution be printed in the minutes of the Association and the Secretary be intsructed to forward a copy to the relatives of each of the departed.

Report of the Committee on Resolutions

After an absence of two years from Atlantic City, we return and receive the same cordial welcome from her citizens, through their distinguished Mayor, Mr. Edward Bader.

We are also honored with the presence of the representatives of the Railway Age, Railway Purchase and Stores, and other prominent guests and distinguished visitors.

In acknowledgement of such, it is the desire that a public expression of our appreciation be tendered.

Therefore, be it resolved:—That a vote of thanks be extended to these gentlemen, and to our President and his staff, together with the members of our executive committee, together with the various standing committees, for their very able and efficient services in our behalf; and that the same vote be extended to cover the efforts of the New York Central and Southern Pacific representatives for their portrayal of Supply Train and Unit System of Filing:

And be it further resolved: That we are highly honored by the presence of Vice-President Elisha Lee of the Pennsylvania Railroad and Mr. Wise from Washington, and that a vote of thanks be extended to them for their very instructive addresses; and

Be it further resolved: That we express our appreciation to the management of the Traymore Hotel for their reception and cordial treatment extended to our Division while in their midst.

Resignation of J. P. Murphy

J. G. Stewart: The general committee has received the resignation of J. P. Murphy, as secretary. Mr. Murphy has been to our association almost as a father. I believe at every meeting we have had Mr. Murphy has been present and in every way getting into it and working. I am almost certain, although not entirely so, that he was the leading spirit in suggestion in an association of this kind. I am almost certain that, except for the efforts Mr. Murphy put forth, not always pleasant ones, but nevertheless always enthusiastically given by him, this organization would never have existed.

I would like to offer this resolution to our meeting today:

"It is with sincere regret that we received the resignation of J. P. Murphy, as secretary of Division No. VI. Purchases and Stores, and in accepting this resignation, we are not unmindful of the valued service and great sacrifice Mr. Murphy has rendered for the success of the Railway Storekeeper's Association and Division VI of the Purchases and Stores of the A. R. A., and it is only at his own request and urgent desire that this association accepts his resignation."

(A standing vote was taken and the secretary directed to see that Mr. Murphy received a copy of the resolution, and also to send copies to the N. Y. Central officials.)

Election of Officers

The following members to the General Committee were elected for 1923.

General Committee for two-year term, expiring June, 1924.

Chairman—F. D. Reed, Vice-Pres. C. R. I & P.
Vice-Chairman—U. K. Hall, Supv. of Stores U. P.

Expiring 1924.

R. C. Vaughan, Vice-Pres. Canadian National Railways.
R. J. Elliott, Pur. Agent Northern Pacific.
H. H. Laughton, Asst. to Vice-Pres. Southern.
W. G. Phelps, Pur. Agent Pennsylvania.
Wm. Davidson*, General Storekeeper Illinois Central.
C. D. Young, general supervisor of Stores Penna.

J. G. W. Stewart, General Storekeeper C B. & Q. Expiring 1923.

J. F. Marshall, Pur. Agent C. & A.

*Mr. Davidson—J. F. Marshall to fill out the unexpired term of U. K. Hall.

Nominating Committee

In accordance with Section 4 (g) of the Rules of Order, the following members were elected members of the Committee on Nominations during the ensuing year:

F. A. Bushnell, Purchasing Agent Great Northern.

J. G. Stuart, General Storekeeper Chicago, Burlington & Quincy.

O. Nelson, General Storekeeper Union Pacific.

H. P. McQuilkin, General Storekeeper Baltimore & Ohio.

G. A. Secor, General Storekeeper Chicago & Alton.

(*The Division VI was adjourned.*)

Registration, American Railway Association

Division V—Mechanical

Burgert, Otto, Gen. Fore., Penn., Lloyd.
Burns, R. C., Asst. Engr., Penn., Haddon Hall.
Campbell, W. T., Vice Pres., N. Y. S. & West., Ambassador.
Caton, S. W., M. C. B., N. M., Monticello.
Chandler, C., Asst. Eng. of Bridg., I. C., Ambassador.
Chidley, Jos., S. M. P., N. Y. C., Marlborough.
Clark, J. C., Gen. Fore., P. R., Traymore.
Collins, M. E., Gen. Car Fore., C. & O., Haddon Hall.
Corbett, W. H., Div. M. M., M. C., St. Charles.
Crawford, D. F., Past Pres., M. C. B. & M. M. assus., Brighton
Creel, C. L., M. M., Sewell Valley.
Cunningham, E. A., Eff. Eng., C. P., Ambassador.
Cunningham, J. L., S. M. P., Penn., Ambassador.
Currie, H. A., Asst. Elect. Engr., N. Y. C., Traymore.
Davenport, J. E., Engr. Dyn. of Tests, N. Y. C., Marl.
Elmer, Wm., Supt. Middle Div., Penn., Traymore.
Falck, F. M., Gen. Mgr., P. & R.
Farrell, A. J., Supt. Shamokin Div., P. & R.
Foortsch Thos. A., Road. Fore. of Eng., P. & R.
Gleason, M. A., M. M., B. & O., Osborne.
Hallett, W. E., Gen. Mgr., Bangor & Aroostook, Marl.
Hanlon, A. A., Asst. Train., P. & R.
Harper, H. L., Genl. Air Brake Insp., L. V. & H. R., Bothwell.
Harris. H. E., Genl. Fore. Car Dept., N. C. & St. L., New England.
Hassett, M. W., M. M., N. Y. C., Worthington.
Hatch, F. G., Gen. Fore., B. & M, Y. M. C. A.
Hawhine, R. D., G. S. M. P., A. C. L., Ambassador.
Heinbach, Wilfred F., G. F., P. & R., Bosworth.
Hendricks, L. W., M. S., Bangor & Aroostook, Haddon Hall.
Hudson, H. H., Asst. Engr. Test., N. Y. N. H. & H., Strand.
Jones, N. W., Asst. Supt. N. Y. Div., P. & R.
Kelley, M. J., Supt., C. W. Pull. & S., DeVille.
Kifer, H. W., Trav. Air Brake Ins., S. P., Princess.
Lenzner, S., Sup. Pass. Frt. Dept., M. C.
Levesque, G. F., M. M., Quebec Mont. & South., Princess.
Lyons, T. F., Air Brake Instr., N. Y. C. West, Haddon Hall.
McCary, A., Gen'l. Fore. Elect. Car Ltg., N. Y. C., Breakers.
Maher, M. A., Agt. E. J. & E. R. R., Joliet, Ill. Chelsea.
Marsh, F. E., Gen. Shop Insp., Penna.
Miles, C. B., Air Brake Sup., Big 4, Princess.
Moist, H. I., Gen. Fore. Loco. Dept., R. F. & P., Marl.
Muddell, J. L., Air Brake Instr., Penn.
Musser, C. W., Con. Fore., Penn.
Nicholas, R. H., Asst. M. M., C. R. R. of N. J., New Brady.
Niemann, J. J., Rd. Fore. of Eng., Penn.
O'Donnell, John, Gen'l. Fore., L. I., Chalfonte.
O'Neill, Fred C., Air Brake Instr., C. C. C. & St., Princess.
Ott, W. B., M. M., Penn., Seaside.
Palmer, L. W., M. M., East Broad Top, Richmond.
Ramage, J. C., Eng. of Tests, Southern, Chalfonte.
Rausch, H. S., Gen'l. Fore., N. Y. C., Grand Atlantic.
Reed, M. P., M. M., Penn., Craig Hall.
Reilly, R. J., Genl. Agt., L. V.
Riddell, Frank, Ch. Power Plant Insp., Penn., Marl.
Robinson, J. J., M. M., Southern, Dennis.
Rogers, J. W., Gen. Elect., Penn.
Rudolph, J. R., Genl. Air Brake Insp., L. I., Haddon Hall.
Smith, L. G., E. E., L. V.
Stenason, W. G., Gen'l. Air Brake Insp., Can. Pac., New England.
Strunk, John H., G. F., P. & R., Wyoming.
Stubbins, W. T., Gen'l. Fore., Penna., Haddon Hall.
Summer, E., S. M. P., Penn.
Swope, B. M., Asst. M. M., Penn.
Tutt, F. H., M. S., M. K. T., Traymore.
Umpleby, C. H., M. M., N. Y. C., Princess.
Wynn, E. P., Sup. P. & S., P. & R. R. R.

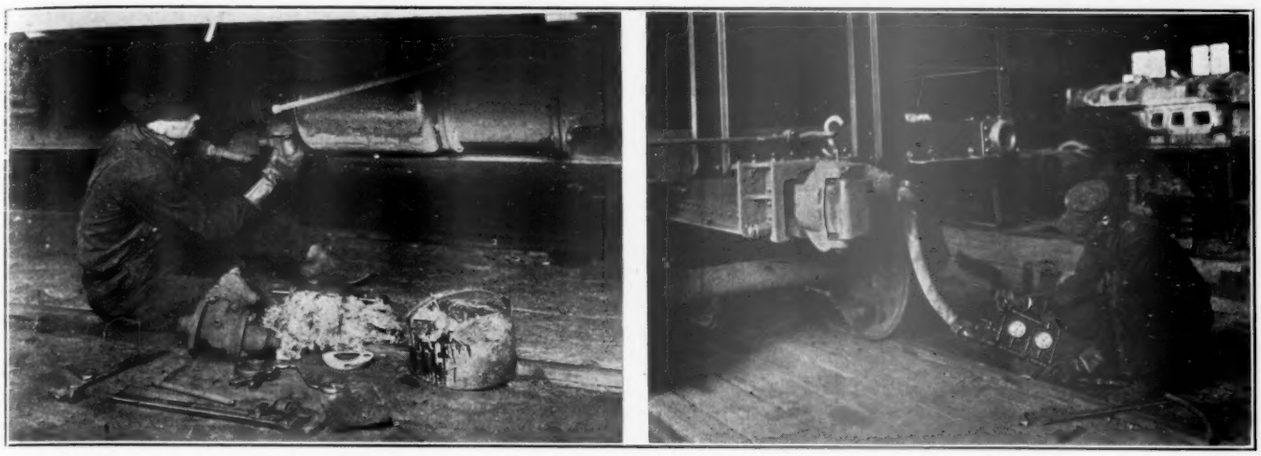
Division VI—Purchases and Stores

Clay, W. J., A. G. S., P. R.
Elder, S. M., Lum. Agt., B. & O., Strand.
Justice, H. B., A. S., P. R. R., Avon Inn.
Kroesen, F. I., S. C., P. R. R.
Sickel, S. R. Ch. Cl. Pur. Dept., P. & R.
Whitman, J. H., St. Dept., P. R. R.

Special Guests

Ainsworth, N. J., Gen'l. Air Brake Insp., D. & R. G. W., Haddon Hall.
Allison, Jos. L., Asst. For., P. & R.
Allison, Mrs. Jos. L., Asst. For., P. & R.
Appleton, W. H., Fore. Eng. House, Penn.
Austin, J. B., Fore., Penn.
Barr, B. T., Air Brake Insp.
Beck, I. N., A. B. Fore., C. R. R. of N. J., Edison.
Bell, F. E., R. F. of E., Virginian, Bothwell.
Bensh, O. A., Air Brake Mach., L. I.,Station Hotel.
Berry, Ellis, Yard Cl., G. T., Martinique.
Bickel, Oliver A., Drafts. M. P. Dept., P. & R., Stanley.
Bickley, W. H., Eng. Fore., Penn.
Bliss, H. A., Gen'l. Air Brake Insp., B. & M., Bothwell.
Bogart, F. W., Air Brake Fore., Erie, Holmhurst.
Bommel, C. T., Sup. Maint. of Stand., B. & O., Schlitz.
Booth, J. F., Air Brake Fore., C. & O., Haddon Hall.
Bower, Samuel D., C. C. to P. D., B. & O., Strand.
Bowman, Burton W., Mach. Air Brake Asst., L. V., Princess.
Boylan, E. J., Fore., Penn., Brighton Apts.
Bracken, J. L., Asst. Elec. Engr., New Haven.
Brenchley, F. W., A. B. M., Erie, Wyoming Valley.
Brooks, L. M., Sec. to Chf. Eng. M. P. & R. S., N. Y. C., Traymore
Brown, C. M., Air Brake Insp., Ga. & Fla., Breakers.
Burke, J. A., Asst. Gen'l. Air Brake Co., A. T. & S. F., Haddon Hall.
Burke, Thomas F, Air Brake Instr., Wheel. Tract, Princess.
Byrnes, Lawrence V., Eng., P. & R.
Caruthers, E. W., Supv. Draft., Penn.
Cashman, Edw. A., Air Brake Insp., P. & R., Princess.
Cavanaugh, Mrs. C. H., P. & R., Somerset.
Clark, H. A., Gen'l. A. B. Insp., Minn. & St. Paul & S. S. M., Haddon Hall.
Clegg, Thos., Air Brake Insp., Can. Nat., New England.
Clinger, G. E., M. W. & S. Store., Penn., Blackstone.
Congle, Bertus D., Fore. Mach., L. V., Belmont.
Conley, Mr. J. H., Spec. Stat., L. & N. E.
Cook, C., Retired Fore., Md. Div., Penn.
Cox, Geo., Lead. Draft., N. Y. C.
Coyle, G. W., Eng., B. & O., Lyric.
Coyne, W. A., Fore. Air Brake Dept., N. Y. C., New England.
Crain. Raymond B., A. B. I., D. L. & W.
Crawford, H. E., Stock., W. J. & Seashore, City res.
Croft, Geo. W., Mach., A. T. & S. F., Princess.
Crossen, Garfield, A. B. Fore., Ann Arbor, New England.
Curley, W. P., Mach. Apprent., (A B.), Sou., Y. M. C. A.
Daley, F. M., A. B. F., Rultand, Wiltshire.
Dalton, R. P., C. C., C. R. I. & P., Ambassador.
Davies, W. H., Supt. Air Brakes, Wabash, Haddon Hall.
Davis, Daniel, Air Brk. Fore., D. & H., Wiltshire.
Davis, Nellie M., Steno., P. R. R., De Ville.
Davis, R. L., Engine House Fore., Penn., Shelburne.
Davis, Wm. R., M. App., P. R. R., De Ville.
Deal, Sr., Alonzo W., Air Brake Inspr., P. & R. Youtie's Apt.
Dean, B. C., Drafts., B. & M.
Deihl, Richard W., Trav. Fore. N. Y. Div., P. & R., Newfield.
Demarest, G. W., Insp. M. P., Penn. Lake Div., Hall Room.
DeTurck, F. D., Asst. Fore., P. & R., Arlington.
Detwiler, Harvey L., Gov. Insp., U. S. A., Dixie.
Detwiler, Neil L., Mech., P. R. R.
Devine, W. J., Gen. Air Brake Instr., C. & N. W., New England.
Doerr, H. C., Fore. Air Brake Dept., D. & I. R., Alamac.
Dolan, Ed., Air Brake Instr., N. Y. C. & St., De Ville.
Domrone, E. J., Engineer, B. & O., New England.
Donagan, O. A., Gen'l., Stores Account., B. & M., Colonial.
Donlon I. J., Asst. Fore. Md. Div., Penn.
Dow, T. W., Gen'l. Air Brake Insp., Erie, Haddon Hall.
Downs, Frederick W., Asst. Gen. Fore., P. R.
Draney, John, Eng., Lack., Traymore.
Drye, A. C., Insp. G. A. B., G. T., Blackstone.
Dupell, R. E., Ret. R. F. of E., Penn.
Durden, E., Fore. Air Brakes, Southern, New England.
Earnshaw, Wm. T., Elect. Insp., Penn.
Edmonds, C. G., Asst. Eng. House Fore., B. & O., New Hampshire.
Edwards, N. F., Road Fore. of Eng., Penn., Llewlyn.
Epright, Reeve, Penn., Craig Hall.
Ernst, Wm., Lead. Drafts., N. Y. C.
Eshback, Harry W., Fore., P. & R.
Esterly, Wm. D., Mech. Drafts., P. R., New England.
Fackler, E. M., A. G. C. I., P. & R.
Fair, E. E., Eng., Wabash, Chatham.
Feeney, C. J., Asst. Fore., P. T. Div., Penn., Emmett House.
Ferguson, Geo., Air Brake Distr., Penn.
Filer, Jas., Ch. Eng., P. & R. R. R., Woodbridge.
Fisher, C. A., Chief Train Disp., P. R., Strand.
Fister, J. S., Eng., W. L. E., Haddon Hall.
Foley, John. Forester, Penn., Traymore.
Forner, Oscar, Asst. Road Fore. of Engines, C. R. R. of N. J., Brady House.
Frank, C., Asst. Air Brake Insp., M. C., Bothwell.
Freese, Harvey L., Asst. Fore. M. P. & R. B., P. & R., Stanley.
Frey, A. A., A. B. R., P. B. & N. E., Holmhurst.
Fuller, H. L., T. E. & Asst. Genl. A. B. I., D. & R. G W, Princess
Gall, H. J., Eng., Penn.
Gallagher, Peter F., Fore., Boiler Maker, B. & O., Station.
Garaghty, W. G., Air Brake Inst., B. & O., Breakers.
Gardiner, J. E., Air Brake Insp., Bothwell.
Gillespie, P. K., Air Brake Instr., C. R. R. of N. J., Lyric.
Gilmore, T. D., Air Brake Sup., Oregon Short Line, Haddon Hall.
Glascock, Mrs. W. O., Terminal.
Glascock, W. O., A. B. I., G. C. & S. F., Terminal.
Glasgow, J. R., Foreman, Penn., Iroquois.
Glick, N. A., Air Brake Insp., Bangor & Aroostook, Haddon Hall.
Goodfellow, J. W., R. H. Fore., Penn., Blackstone.
Goodloe, J. T., Trav. Store., Southern, Breakers.
Gormerley, Miss.
Gossler, George S., Ret. Erect. Fore., P. & R.
Graetz, N. R., Fore. Air Brakes, Southern, Breakers.
Griffith, N. C., Fore. Elec. Tract., Penn.
Griffiths David, Fore., Penn.

Grovscors, B. W., Fore. P. T. Div., Penn.
Guigrich, S. E., A. B. M., P. S.
Haag, Wm., Spec. Engr., N. Y. C., Morton.
Haas, Frederick, Cl., P. & R. R. R.
Haas, Mrs. Frederick.
Hales, Owen, Air Brake Fore., Detroit & Mac., New Belmont.
Haley, Jr., G. D., Gang Fore., Penn. Alamac.
Haley, M. J., Foreman, Penn.
Hall, Samuel, Fore. Car. Insp., P. & R.
Hall, W. C., Eng., A. C., Lexington.
Hammond, Mrs. W. O., Terminal.
Hammond, W. O., A. B. F., G. C. & S. F., Terminal.
Hanlon, F. J., Insp. Off. Dist. Sto., Penna. System.
Haran, Luke, Air Brake Mach., N. Y. O. & W., Avon Inn.
Harding, J. W., Text Bk. Writer J. C. S., Wiltshire.
Harris, S., S. K., R. K. & P., Brighton.
Hart, L. B., Eng. Air Brakes, B. & O., Allyn.
Hatless, Byron W., M. C. Asso., Virginian.
Hayes, Arthur A., Brake Assn., St. L. & San Fran.,
Heiser, Geo. W., Drafts., P. & R., Gage.
Heist Floyd L., Transit., P. & R., Tabor.
Hemminge, Albert P., Shop Insp., Penn.
Hennick, G. L., Car Fore., B. & O., Silverside.
Henry, F. C., Eng., Virginian, Princess.
Herndon, W. D., A. B. Insp., Jacks Term., Staunton.
Hibbs, C. E., Asst. Road Fore. of Engs., Penn., Seaside.
Hinman, J. M., Dist. Store., M. P., Breakers.
Hitchen, B., Air Brake Insp., B. R. & P., New England.
Hoffman, R. T., Eng., Penn.
Hogan, Francis R., Asst. Rd. Fore. Engs., P. & R.
Holmes, A. M., P. A., L. H. R., Haddon Hall.
Holmstead, T. H., Eng., Penn.
Hooper, W. G., Shop Fore. Md. Div., B. & O., Princess.
Horton, Clarence, Fore. Instr., P. & R.
Howe, John C., Asst. Fore., P. & R.
Hubbard, J. A., Air Brake Repair., Penn., Princess.
Hukill, W. S., Chf. Drafts., Md. Div., Penn.
Hulfish, T., Air Brake Fore., Southern, Breakers.
Hummel, Albert M., Mach., P. & R., Princess.
Hunter, J., Conductor, G. T., New England.
Hunter, W. C., Air Brake Insp., Can. Natl. Rys., Haddon Hall.
Ingram, C. Y., Transaction Clk. (P. D. H.), Penn.
Jewell, L. A., Air Brake Supvr., Nickel Plate, Bothwell.
Jex., W. A., Sup. Air Brake, J. & O. Cent. Sys., Princess.
Johnson, V. E., Trav. Store., D. L. & W., Bothwell.
Johnston, R. S., Foreman P. T., Penn.
Joiner, T. N., Eng., Penn.
Jones, J. Archie, Air Brake Supvr., D. & H., Wiltshire.
Jones, B. V., Asst. Fore. (Air Brake), P. & R., Station Hotel.
Jones, Harvey L., Eng., Atlantic City.
Jones, W. F., Foreman, Penn.
Jost, J. William, M. P. & R. E. Dept., P. & R.
Kalb, J. A., Train Ltg. Insp., Penn.
Kaley, C. W., Conductor, W. J. E., Bothwell.
Kane, C. J., Gang Fore., Penn.
Kaselan, E., Sup. of Piece Work, Erie, Princess.
Kastla, Louis, Eng., B. & O., Bothwell.
Keckefoth, F. J., Machine Fore., C. & N. W., Blackstone.
Kehler, Ralph B., Fore., P. & R.
Kelley, Henry S., A. B. Inspr., M. C., Princess.
Kelley, H., S. F., Penn.
Kelly, Philip M., Insp., M. P. Dept., C. R. R. of N. J.
Kidney, E. A., Penn., Seaside.
Kilpatrick, W. H., Fore., Penn.
Koch, Louise Miss.
Koch, Philip Mrs.
Koch, Philip, For. Eng. H., Atl. C. R.
Koeling, C. H., Air Brake Inst., P. E.
Kuhn, L. C., Air Brake Mach., P. C. C. & St. L., Princess.
Lamb, William N., Fore. Paint Shop, Penn.
Langham, John N., C. & A., Blackstone.
Langham, J. W., Store & Shop Acct., C. & A., Blackstone.
Larkins, Mrs. Thos. A., Globe.
Larkins, Thos. A., Gen. Yard Mas., P. & R., Globe.
Lavelle, John, Air Brake Insp.
Lawson, Albert E., Loco. Eng., G. T. Can., Avon Inn.
Layton, J. L., Insp., P. & C. Dept., Penn.
Leas, Mrs. Zieber J.
Leas, Zieber J., Asst. For., P. & R.
Leiper, C. I., Genl. Supt. N. J. Div., Penn.
Leming, Miss.
Lenhart, Paul M., Sr. Comput. Val. Dept., P. & R., Gage Room.
Leonard, W. W., Chf. Car Light. Supv., B. & O., Ressler.
LeSure, H. K., Chf. Elec., Penn.
Limb, Wm., Mach., P. & R.
Linson, C. N., C. P. D., P. & R.
Litchfield, Norman, Consult. Engr. Off., Penn., Haddon Hall.
Livingston, Hugh J., Insp. Air Brakes, B. I., Bothwell.
Longfellow, Mrs., Reed Apts.
Looney, J. O., C. A. P. Insp., N. & W., Wiltshire.
Lotz, Paul P., Mech. Apprent., Southern, Y. M. C. A.
Lukens, H. A., Coal Agt., Penn.
Lynch, G. G., Chief Drafts., A. C. L., Haddon Hall.
Lyons, George E., Asst. Fore. Power Plant, Penn.
Lyons, J. C., Genl. Erect. Fore., J. C., Princess.
MacDaniels, J. R., Genl. Air Brake Insp., U. P., Bothwell.
MacDonald, W. G., Fore., Penn., Monticello.
MacRae, Albert, Editor Santa Fe Mag., Santa Fe, Breakers.
McAneney, J. J., Air Brake Fore., N. & W., McGinley House.
McCaughan, J. C., Ch. Insp., R. Adm.
McCauley, A. H., Mach., Penn., Boscobel.
McCauley, G. B., Chf. Clk. to Dist. S. K., Penn.
McClintock, E. F., Master Carp., Penn.
McCollum, Thos., Air Brake Insp., M. C., New England.
McCracken, I. S., Fore., Penn.
McCutcheon, John C., Mech. Instr., Wabash, Haddon Hall.
McDonald, N. J., Nat. Superv., Penn.
McElvaney, C. T., Supvr. Air Brakes, M. K. & T., Princess.
McFarland, F. R., Air Brake Supvr., B. & O., New Brady.
McGarr, John E., Air Brake Mach., L. & N., Y. M. C. A.
McHugh, C. J., Gang Fore., Penn.
McIntyre, John, Trav. Air Brake Insp., M. C., New England.
McKeand, P. A., Toledo Terminal, Shelbourne.
McKeon, Robt., A. B., B. & O.
McKinley, Samuel C., Chf. Clerk, P. & R.
McMenamin, C. G., Shop Insp., Penn.
McMulkin J. C., Air Brake Insp., M. C., Bothwell.
McSweeney, P. E., Air Brake Fore., St. L. & San Fran., Haddon Hall.
McSweeney, Thos. J., Air Brake Instr., Penn.
Madara, Wm. C., Asst. Fore., P. & R., Roberts.
Mader, Geo. C., Asst. Fore., Penn.
Mahaney, J. E., S. of S., C. & O., Alamac.
Mais, Frank, C. F., P. R. R., Continental.
Mann, E. Z., Air Brake Instr., A. C. L., Stanton.
Mantes, C., Car Foreman, P. & R.
Marrush, Charles, Air Brake Fore., Southern, Osborne.
Martin, John J., Round House Fore., C. R. R. of N. J., Edison.
Massey, R. V., Elec. Insp., Pullman.
Mathews, A. N., A. B. Fore., D. & H., Wiltshire.
Matthews, W. H., Air Brake Instr., Penn.
Mauger, John T., Fore., P. & R., Stevens.
Maurer, Jas. P., Car Insp., P. & R., Emmet.
Merrick, G. A., Ch. Drafts., N. Y. N. H. & H., Strand.
Metz, Cecil, Fore., Penn.
Miller, C. H., Eng., Penn.
Miller, Howard J., Asst. Fore., P. & R.
Mills, G. S., Supvr. Supply Train, M. K. & T., Traymore.
Minick, J. L., Asst. Eng., Penn.
Montz, John B., Fore., P. T. Div., Penn., Emmett House.
Moore, R. D., Spec. Insp., U. S. R. A.
Moores, G. O., Asst. Engr., B. & O., Arlington.
Morehead, W. S., Asst. S., Ill. Cent., Dennis.
Morgan, H. H., Fore. Paint., C. of G., Osborn.
Morrissey, T. A., Clerk Store., L. V., Princess.
Muntz, J. H., Fore., P. T. Div., Penn.
Murphy, James S., Div. Pass. Agt., Penn., 1301 Pacific Ave.
Murrin, C. H., Insp. Dept. of Mat., U. S. R. A., Biscayne.
Murrin, P. J., Air Brake Ins., C. B. & Q., New England.
Murs, Robert F., Asst. Fore., P. & R.
Mutter, John, Asst. Air Brake Instr., B. & L. E., St. Charles.
Myer, C. R., Genl. Fore., Penn.
Myers, J. J., Erect. Fore., Penn.
Newman, F. C., Asst. Div. Store., Southern, Breakers.
Nickols, C. H., Road Fore. of Engrs., L. V., Mansion.
Nishi, Iwao, Comm. Attache' to Japanese Embassy
Noland, Geo. W., Conductor Fore., Penn. Princess.
North, J. H., Chf. Clerk to V. P., L. & N. E.
Norton, A. W., Equip. Pib. Engr.' B. & O., Arlington.
Oberer, Fred, A. E. Fore., A. T. & S. Fe., Haddon Hall.
Oberlander, Chas., Mach., B. & O., Marlborough.
O'Brien, Miss Mary, Arnold.
Ochse, D., Air Brake Fore., B. & O.
O'Dea, J. T., Asst. to Pres. & P. A., P. & P. U. Ry., Ambassador
O'Doherty, C. J., Div. Store., G. T., Chelsea.
Olsen, Wm., Sup. Steam Plt., N. Y. C., Traymore.
O'Neil, Bernard J., Car Insp., P. & R., Milburn Cottage.
O'Neil, F. P.,
Otterstrum, Miss Marie, Bothwell.
Overy, Bert, Air Brake Mach. Fore., I. C. R. R. (Clinton, Ill.) Senator.
Parker, J. F., Gang Fore., Penn.
Parkinson, W. S., Elect. Inspt., Penn.
Patchell, Robert E., Elect. M. P. & R. E. Dept., Atlantic City.
Pearce, C. B., Rot. Asst. Eng. House Fore., Penn.
Peoples, J. C., Shop Fore., Penn.
Phillips, C. P., Asst Air Brake Insp., C. & O., Haddon Hall.
Phillips, C. R., Fore., Md. Div., Penn.
Phillips, J. H., Gen'l. Air Brake & Steam Insp., C. & N. W., New England.
Plank, L. C., Insp., Penn.
Polkinghorne, J. P., Air Brake, A. C. L., Stanton.
Powers, C. E., Special Insp., B. & O.
Prettyman, A. J., Fore. Elect., G. C. T. Co. N. C. R. R., Colonial
Pribble, B. S., Chief Clerk, R. F. & P., Runnymede.
Proud, N. G., Asst. Fore., Penn.
Pugh, A. R., Gen. Air. Brake Insp., Seaboard Air Line, Princess.
Rake, H., Loco. Fore., Can. Nat. Rys., Somerset.
Rake, Rex, Can Nat. Ry., Somerset.
Ramp, C. K., Mach., B. & O., Haddon Hall.
Reed, H. B., Genl. Fore., Pullman, Pullman Co.
Rees, M. E., Fore. Car Insp., Penn., Princess.
Rees, M. E., Fore. Car Insp., Penn.
Remfry, C. N., Genl. Air Brake Insp., D. M. & N., Senator.
Reusswig, E. J., Ch. Clerk to Supt. M. P., N. Y. C., Shelburne.
Rhoads, Webster S., Jr., S. M. P., B. F. & R., Marl
Rice, Jere L., Insp. Safe. Dept., Lyris.
Rickert, John P., Asst. Fore., P. R. R.
Ripke, Frank J., Asst. Fore., Penn.
Rissmiller, N. E., Fore., P. & R.
Robbins, R. H., Air Brake, Penn., Haddon Hall.
Robinson, T. N., Chf. Drafts., H. V., Traymore.
Roberts, G. S., Shop Ins., Penn., Haddon Hall.
Roderick, N. B., Supvr. Tools & Machinery, Erie, Breakers.
Rodgers, C. J., Store., D. L. & W., Lexington.
Rodgers, H. L., M. E., T. & N. O., Ritz Carlton.
Rogers, John L., M. E., Inter. Comm. Comm., Alamac.
Roney, John, Asst. Train Mast., L. V., Ehrit.
Rose, N. W., E. F., Duluth & Iron Range, Ritz.
Roth, S. M., Fire. & Air Brake Ins., West Maryland.
Router, W. H., Air B. For., I. C., Haddon Hall.
Rule, G., Eng., B. & O., Lyric.
Rutherford, S. A., Air Brake Instr., Wabash, Chalfonte.
Saltzer, Glance N., For. M., P. & R. R.R.
Saltzer, Mrs. Glance.
Sanders, J. A., Engin., A. C. L., Bothwell.
Sapirstein, Chas., Asst. Gen. Fore., L. I. R. R.
Saylor, H. B., Fore., Penn. Columbia.
Schneider, J. M., Fore., Penn.
Schrode, Bartley A., Fore. Eng. House, P. & R.
Scott, J. R., Genl. Air Brake Instr., St. L. & S. F., Bothwell.
Sebold, C. T., Sec. & Supt. M. P., B. & O., Chelsea.
Seidell, Frank M., A. B. Insp., P. & R. RY.
Seidel, Wm. N., Asst. Supr. Rates, P. & R.
Shea, J. A., Chf. Clk to Gen'l. S. K., N. Y. N. K & P., Traymore.
Shehee, E. B., Air Brake Insp., Southern, Breakers.
Sherman, Frank, Air Brake Instr., L. & N., New England.
Shirley, John A., Asst. Ch. Insp. of Loco., Inter. Com. Com., Alamac.
Siebert, Frank T., Gov. Insp., U. S. A., Dixie.
Singleton, F. I., Eng. on East. & West. Lines, B. & O., Bothwell.
Slaughter, Mrs. R. S., Wiltshire.
Slaughter, R. S., Cl. Pur. Dept., P. R. R., Wiltshire.
Smith, C. W., Pass. Agt., Penn.
Smith, Don Y., Trav. F. Agt., P. & R.
Smith, J. H., Ch. Drafts., C. R. R. of N. J.



Third Session Of The Air Brake Association

Presentation and Discussion of Report on Standard Practices Followed by Election

THE CLOSING SESSION of the Air Brake Association convention was held in Haddon Hall on Wednesday, June 21, 1922, President L. P. Streeter in the chair. After the meeting was opened, the president announced the appointment of the following Nominating Committee: T. W. Dow (Erie), William Clegg (Canadian National) and C. H. Knowlton (*Railway Age*).

Standard Practice

H. A. Clark (Soo Line), chairman of the committee on standard practice, presented the following changes and additions for consideration; these were taken up and acted upon paragraph by paragraph. All were accepted with little or no discussion except a few which were referred back to the committee for further consideration as noted.

Under heading "Air compressors," subheading "Repairs to air compressors," paragraph 2 changed to read: "Air compressors returned to the shop for repairs should be thoroughly cleaned in boiling lye or some other suitable chemical."

Under heading "Air compressors," subheading "Repairing and condemning," paragraphs 1 and 2 replaced by the following: "The caliper of the air and steam cylinders should be determined, and if worn 1/16 in. or more from the diameters shown in the following table they must be rebored. When cylinders have been rebored to the sizes given in table, new piston heads and rings of increased diameter must be applied.

Kind of compressor	Cylinders to be rebored	Diameter new	Diameter after first rebore	Diameter after second or final rebore
		inches	inches	inches
9½-in.	Steam cylinder	9½	9⅝	9¾
9½-in.	Air cylinder	9½	9⅝	9¾
8½-in. C C	High pressure steam cylinder	8½	8⅝	8¾
8½-in. C C	Low pressure air cylinder	14½	14⅝	14¾
	Low pressure steam cylinder	14½	14⅝	14¾
8½-in. C C	High pressure air cylinder	9	9⅛	9¼

Paragraph 4 changed to read as follows: "Piston rods with taper fit should be so arranged as to provide the standard draw, as follows, for different sizes of air compressors:"

Kind of compressor	Draw inches	Standard dimension between heads inches	Minimum dimension between heads inches
9½-in.	3/64	18-11/16	18-43/64
11-in.	1/32	21-3/16	21-11/64
8½-in.	1/32	22-11/16	22-43/64
10½-in.	1/32	22-11/16	22-43/64
No. 2	5/64	16-5/16	16-9/32
No. 5	1/32	21-11/32	21-5/16
No. 6	1/32	18-23/32	18-11/16

Paragraph 5, top of page 231 to be changed to No. 6 and read as follows: "Piston packing rings for air cylinders to be condemned when ring ends will not come together when placed in smallest part of cylinder."

Paragraph 14 changed to read: "All air valves, valve seats and cages to be of steel in all compressors."

Paragraph 15, first sentence changed to read: "In removing piston rod nuts, except castle nuts, they should be split off in line with the rod, to prevent wear and damage to rod threads and replaced with new beveled nuts that snugly fit threads on rod."

Paragraph 20 changed to read: "Piston packing rings for main valve to be condemned when ring ends do not come together when placed in their respective bushings."

Under heading "Brake valves," subheading "Cut-out cocks" to be changed to "Double heading cut-out cocks."

Heading "Distributing valves" to be changed to "Distributing valve and control valves."

Under heading "Gages," subheading "Type" to be changed to "Specifications."

Under heading "Retaining valves," paragraph 8. It is suggested that all retaining valves on vestibule passenger equipment cars be placed inside of the vestibule. (Referred back to committee for further consideration.)

Under heading "Triple valves," subheading "Cleaning and repairing," paragraph 5 changed to read: "Particular attention should be given the piston packing ring. It should have a neat fit in its grove in the piston and also in the triple piston bushing. Once removed from the piston, if distorted in any manner, it should be condemned. The fit of the packing ring in its groove and bushing and the condition of the bushing should be such as to insure the valve passing the prescribed test. New rings should be applied to the piston groove from the slide valve side and the opening should be placed in the top of cylinder while testing. When cleaning triple valves the

opening should be placed on the bottom cylinder. (The reference to application of piston ring to groove from slide valve side is added.)"

Paragraph 10 changed to read: "The cylinder cap gasket and check valve case gasket must be carefully examined and cleaned with a cloth but should not be scraped. In cleaning emergency valve seats no sharp instrument should be used that would possibly scratch or mar it. All flat seats should be re-machined to the standard half-round bearing. In re-machining emergency valve brass seats, they shall be parallel to and not to exceed $\frac{1}{64}$ in. below the finished outer surface as illustrated in drawing." (Drawing is added to make meaning more clear.)

Paragraph 15 changed to read: "Lubricate the seat and face of slide valve graduating valve with very fine high grade dry graphite prepared especially for the purpose, rubbing it thoroughly on the slide valve seat and slide valve face; also upper portion of bushing where slide valve spring bears. Endeavor to have as much as possible adhere to and fill up the pores of the brass, leaving a very thin coating of free graphite. The parts lubricated with dry graphite must be free from oil or grease." (First sentence changed by adding "very fine" and "prepared especially for the purpose" to bring out more clearly the grade of graphite to be used.)

Under heading "Brake cylinders," subheading "Cleaning and lubricating" paragraph 8 to be omitted. (This is covered in paragraph 7.)

Subheading "Brake pipe" part of paragraph 1 and paragraph 2 to be put in proper place.

Paragraph 7 changed to read: "Brake pipe on the rear of tender should be as per A. R. A. standards for cars. Brake pipe hose connection on engine should be on the left side of pilot when facing the front of engine, except where recessed pilot is used. Print shows recommended location for this type of pilot. (M. C. B. changed to A. R. A. and last sentence added.)" (In connection with this suggestion there was some discussion relating to A. R. A. standard locations and while some advocated adding a copy of the A. R. A. drawing it was not considered advisable to do so.)

Subheading "Retaining valve pipe" paragraph 4 changed to read: "All pipe used in connection with retaining valve should be wrough iron. (This eliminates the recommendation for using galvanized pipe and fittings on coal and refrigerator cars.)" (Referred back to committee.)

Paragraph 5, last word to be "pipe" instead of "type."

Under heading "Foundation brake gear," subheading "brake power" paragraph 2 to be omitted. This is covered in paragraph 3 and table.

Table under paragraph 3 to have eighth item under brake cylinder pressure changed from 60 lb. to 50 lb.

Paragraph 11 to have "60 pounds" changed to "70 lb." in connection with empty and load brake.

Paragraph 12 to read: "Length and location of brake lever guides to be such as to provide for full take-up of slack by automatic slack adjuster and with 12-in. piston travel, without permitting levers to strike." (Eleven inch piston travel changed to twelve inch.)

Under heading "Air hose" paragraph 4. In connection with air brake hose coupling gages, it has been suggested that the Air Brake Association recommend to the A. R. A. that standard gages be designed for use with signal hose couplings. (Announcement made that this has already been taken up and adopted.)

Paragraph 5 to be added. "Gaskets should be purchased in accord with A. R. A. standards."

Under heading "Dummy couplings," paragraph 1 changed to read: "Passenger equipment cars, also cabooses and locomotives to be equipped with dummy couplings for the brake pipe and signal pipe hose; they to be suspended with a chain of liberal length to prevent kinking of the hose and not to exceed 15 inches from center line of car on opposite side to that of brake pipe. (The change consists in limiting the distance away from center line of draw-bar to prevent going to the extreme in location that will necessitate an excessive length of chain."

Under heading "Hand brake power" paragraph 1 changed to read: "With the foundation brake so arranged as to give a braking power of not less than 80 per cent based on a 50 lb. cylinder pressure, the hand brake shall be so proportioned that a force of 125 lb. applied 3 in. from outer end of hand brake ratchet lever will develop the equivalent at the brake cylinder piston, of the cylinder value at 30 lb. pressure per square inch."

Paragraph 4 changed to read: "With the body and truck levers properly proportioned for 60 per cent braking power based on a 50 lb. cylinder pressure, the hand brake leverage between brake staff and cylinder shall be so proportioned that a force of 125 lb. at the rim of the brake wheel or 3 in. from outer end of hand brake ratchet lever will develop a pull at the brake cylinder piston of not less than 2,500 lb. and 3,950 lb. respectively for cars having 8 in. and 10 in. cylinders. This will insure a minimum hand brake power at the shoes of 60 per cent of the empty car weight." (This is the A. R. A. requirement for tank cars, and the suggestion was made in order to extend this to cover all cars. Referred back to committee as the subject is now under consideration by A. R. A.)

All places where M. C. B. rules are referred to should be changed to A. R. A.

The report was signed by the following committee: H. A. Clark (Soo Line), chairman; C. N. Remfry (Duluth, Missabe & Northern); F. J. Barry (New York, Ontario & Western); T. W. Dow (Erie); R. C. Burns (Pennsylvania), Committee.

Business and Election of Officers

The committee previously appointed presented the following nominations. The election which followed was unanimous. President, Mark Purcell (Northern Pacific); first vice-president, George H. Wood (Atchison, Topeka & Santa Fe); second vice-president, Charles M. Kidd (Norfolk & Western); third vice-president, R. C. Burns (Pennsylvania); secretary, F. M. Nellis (Westinghouse Air Brake Company); treasurer, Otto Best (Nathan Manufacturing Company).

The election of Mr. Burns to the office of third vice-president left a vacancy on the executive committee, which was filled by the selection of Harry Flynn (Delaware & Hudson).

Following the election speeches were made by the incoming officers. Secretary Nellis spoke of the increase in interest which followed the announcement of the decision to hold a convention this year. He told the members that steps toward amalgamation of the Air Brake Association with the A. R. A., had been given up but that the suggestion had resulted in a hearty co-operation which would be of help to the association. It is not the desire or intention to establish a regular practice of holding the annual conventions at Atlantic City in conjunction with the Mechanical Division, although this will probably be done from time to time. Other conventions will be held in different sections of the country as has been the practice in the past. There has also been considerable agitation on the part of some looking toward the selection of Chicago as a permanent place of meeting, but that also has been given up. There is a growing realization on the part of mechanical officers of the importance of the work of the Air Brake Association which is very encouraging.

After a number of resolutions had been passed, the twenty-ninth convention was adjourned at 12.30 p.m., to meet at Denver, the first Tuesday in May, 1923.

Conventionalities

E. B. Leigh, president of the Chicago Railway Equipment Company, has been attending the conventions as usual. As all who know him are aware, Mr. Leigh takes a very active interest in the work of organizations which are trying to improve industrial conditions, and especially railway conditions. Besides having always been one of the leaders in the Railway Business Association, he represents the National Association of Manufacturers on the National Industrial Conference Board, whose research work regarding labor matters especially, has been among the most important ever done in this country.

The Santa Fe crowd are surely a hard working bunch. Mr. Purcell hardly allows them time to eat their noonday luncheons. Sharp at 2:30 they assemble at the entrance to the pier and for the next four or five hours they are kept busy studying the merits of the various devices in the exhibit and comparing notes. In addition to Mr. Purcell, who has just been elected vice-chairman of the General Committee of Division V, there are present this year J. E. McQuillen, mechanical superintendent, Galveston, Tex.; J. H. McGroff, mechanical superintendent, Ft. Madison, Iowa; C. T. Ripley, general mechanical engineer, Chicago; E. E. Chapman, engineer of tests, Topeka; H. H. Lanning, mechanical engineer, Topeka, Kan.; J. K. Nimmo, master mechanic, Arkansas City, Kan.; W. R. Harrison, master mechanic, Chanute, Kan.; M. J. Drury, supervisor of packing, Topeka, Kan., and F. W. Thomas, supervisor of apprentices, Topeka.

W. D. Duke, general manager of the Richmond, Fredericksburg & Potomac, announces that his railway made an appropriation last week of $1,250,000 for a program of additions and betterments to be carried out during the next year and a half. Almost $1,000,000 of this amount will be used in constructing a new engine terminal at Richmond. Most of the rest will be spent on a coaling station and a hold yard for the reconsignment of cars in connection with the Potomac yard at Washington, D. C. The R. F. & P. handles a very large perishable business and needs more yard room at Washington for cars of this freight that are reconsigned. The road is moving an extraordinarily large business. Its freight traffic in May was the largest in any month of its entire history. Mr. Duke is accompanied to the conventions by Mrs. Duke and their little daughter, Jane, who yesterday celebrated her sixth birthday. They expect to meet here their son, who is on his way to the Pacific Coast.

Mr. and Mrs. Walter B. Leach were joined in Atlantic City yesterday by their two sons, Barton (W. B., Jr.) and Gordon. Mr. Leach must leave on business at once, but the young men will spend a few days here with their mother. They will then go to New York and sail for Europe, where Barton will spend some time studying at the University of Grenoble and at the Sorbonne. Barton is a Harvard graduate and is now studying law at the Harvard Law School. He has had an unusually brilliant college career and during the last year, in addition to carrying on studies which would have given an ordinary young man plenty to do, he taught a class in international law. Barton has studied in France before, but this will be Gordon's first trip to Europe. His friends will follow his future career with great interest and high expectations.

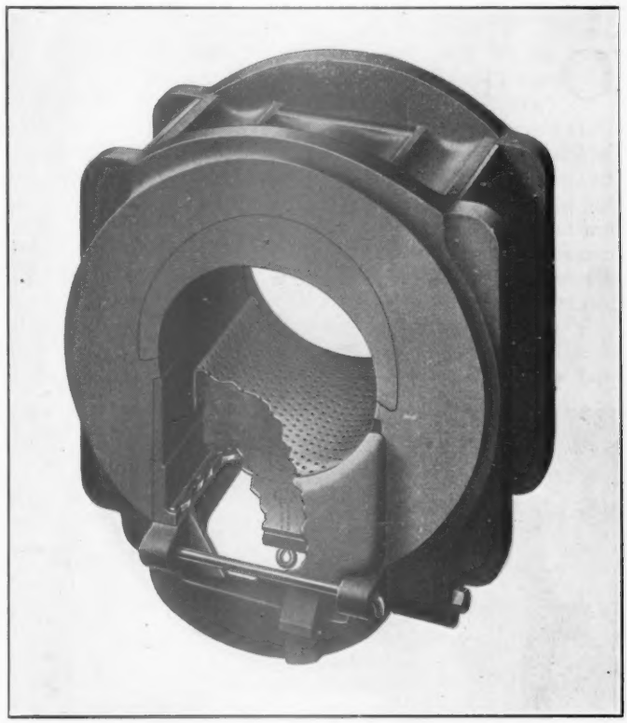
New Devices Among the Exhibits

A Spreader for Driving Boxes

THE ORDINARY DESIGN of locomotive driving box often causes trouble in the roundhouse because the lower ends close in and clamp the cellar so tightly that it is difficult to remove. In order to overcome this drawback, the Franklin Railway Supply Company, New York, has developed a driving box spreader which keeps the cellar free at all times and also secures several other advantages.

The arrangement of a box equipped with the spreader is shown in the photograph. It comprises a steel casting between the lugs of the box, on which the cellar rests, a plate closing the opening at the end of the box, and a pin holding the end plate in position.

To repack the box it is only necessary to take out the pin and remove the end plate, and the cellar being free



Driving Box Fitted with Spreader

can easily be withdrawn. When a new grease cake has been applied, the pin which normally holds the end plate in position is inserted through the indicators to pull the cake and the perforated plate to the bottom of the cellar. After the cellar has been inserted, this pin is withdrawn and again applied to the end plate. The fact that this pin is used for both purposes insures that it will not be left in the cellar and prevent the grease cake from feeding when the locomotive is in operation.

The end plate is held in position vertically by lugs resting on the spreader. The lugs on the two sides of the plate are placed at different heights so that by reversing the plate can be raised to compensate for wear in the

driving box crown brass. The end plate also performs an important function in preventing the weight of the wheel and axle coming on the grease cellar when the locomotive is jacked up.

Train Lighting Equipment

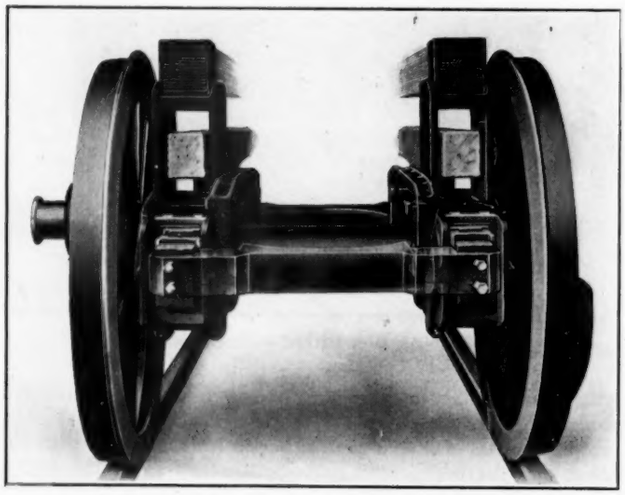
THE GREATER PART of the equipment being exhibited by the Safety Car Heating & Lighting Company consists of new products. Among them are a lead storage battery for car lighting, an electric water heater, an improved electric water cooler, a fan motor which can be used interchangeably on all fans made by the Safety Company, an improved belt fastener of the Walker type, a line of fractional horsepower motors and several new types of lighting units.

The form of plate construction used in the battery is an innovation, and provision is made for flushing batteries and taking specific gravity readings without removing the crates from the battery boxes. Car lighting units are mounted in a trellis over the booth which is built according to dimensions used for Pennsylvania coaches.

New Design of Woodward Lateral Motion Box

ONE OF THE SERIOUS disadvantages of locomotives with long, rigid wheel base is the rapid wear of tires which occurs when such equipment is operated on tracks with sharp curves. The Woodward driving box, which permits lateral motion against a constant resistance, has overcome this difficulty and has been an important factor in making the 2-10-2 type locomotive a practical operating unit. The original design of this device added considerably to the weight of the wheels to which it was applied. This disadvantage has been eliminated in the latest design, which is illustrated in the phantom view.

The new design of lateral motion box utilizes a unique principle for obtaining the constant resistance. The shoe and wedge fits in the boxes have lateral freedom, each



Phantom View of Lateral Motion Driving Box

box moving independently. Spanning the inside top edge of the box is a bell crank which is fulcrumed on the box. The inner member of the spring saddle rests on one arm of the bell crank, while the other arms extend downward and engage flanges on transverse braces between the frames. When the driving wheel is moved inward the force coming on the driving box is transmitted to the arms of the bell crank and as these arms are brought closer to the driving box the saddle is raised, thus causing a constant force to be exerted on the bell crank, tending to restore the box to its normal condition. This design has the advantage of extreme simplicity and also effects an important saving in weight.

Change in Unit Safety Bar

A DESIGN OF Unit safety bar shown this year by the Franklin Railway Supply Company, New York, embodies some changes which experience has shown to be of marked advantage and which have so reduced the space occupied that sufficient clearance has been secured to permit the installation of the locomotive booster without interference. Instead of using the pin itself for the connection to the Unit bar, the auxiliary pocket in the engine draw-casting has been modified so that it forms a boss around the pin, while the eye of the Unit bar has been enlarged to pass over this boss instead of being drilled out only to the pin size. This has materially shortened the pin and resulted in a neat compact and durable arrangement.

Street Locomotive Starter

CLEMENT F. STREET has been working for the past two or three years on a locomotive starter, and although the machine is still in an experimental stage he has one on exhibition. The machine consists essentially of a heavy cast steel ratchet wheel keyed on the trailer truck or tender axle and driven through a spring ratchet by a steam cylinder which is carried on the truck frame. The machine is designed to act as a starter only and to be cut out as soon as the locomotive is under way. It is believed that its use will enable a locomotive to start, without taking slack, any train it can haul and therefore reduce to a minimum break-in-twos on freight trains and eliminate starting shocks to passenger trains.

Trap Door Spring Testing Device

THE O. M. EDWARDS CO., INC., Syracuse, N. Y., is showing a vestibule trap door spring testing machine which is in regular use at its factory. The first spring broke after 93,928 operations which is equivalent to operating a trap door 20 times a day for approximately 13 years. The second spring now being tested was placed in the testing machine on Friday, June 16, and has run over 112,000 operations without breaking.

Flanged Locomotive Tank

A DEVICE that is attracting considerable interest in Space 628 is the Ralo-Acme flanged locomotive tank. Among the distinctive features of this tank are the elimination of the rectangular tank, with a proportional reduction in the liability of leakage; also the bottom flanges are vertical and the rivets used are readily accessible from the inside of the tank and therefore it is not necessary to jack up the cistern from the frame when they need attention. This flanged bottom construction is also a factor in reinforcing the bottom plates as contrasted with the overlapping seams. Further there is a considerable saving in the abolishment of angle iron bars as well as the rivets mentioned.